Datapro Surveys European Users. . . Page 15

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices
©1980 by CW Communications, Inc.

Vol. XIV, No. 49 December 1, 1980 $1.00 a copy; $30/year

NEWSPAPER

Industry Spotlight

Processing Services Now A Whole New Ball Game

By Marcia Blumenthal
CW Staff

The processing services industry is evolving into a whole new ball game. Companies that want to avoid striking out with users are intensifying their development of value-added products and services and expanding into specialized markets.

"I don't see a big future for companies offering a lot of diverse services unless they are large enough to do them well like the Service Bureau Co.," suggested Alfred R. Berkeley of Alex. Brown & Son's, an investment banking firm.

Processing service companies increasingly have been selling off or dropping their less profitable service lines, concentrating on specialized services, noted Robert E. Cook, senior vice-president of market development for STSC, Inc. STSC recently dropped its communications services, which were outside of the firm's mainstream business of financial applications.

One of the few total exits from the market recently was Calldata Systems, Inc., the commercial arm of Grumman Data Systems Corp. The firm reportedly failed because "it tried to be all things to all people" and because it never made the transition from raw time-sharing sales to industry-oriented applications sales, one industry observer noted [CW, May 19].

(Continued on Page 10)

Stores Get 3-D Scanner

By Bruce Hoard
CW Staff

WHITE PLAINS, N.Y. — IBM has introduced a holographic supermarket scanner that improves on previous scanners by reading the Universal Product Code (UPC) from a variety of angles.

Designated the 3687, the laser-based scanner represents one of the first commercial uses of holography.

It owes its versatility to the three-dimensional properties of the holographic process. The three-dimensional effect is created by a ring of mirrors that reflect light and act as lenses and prisms, IBM said.

As the scanner senses the UPC being drawn toward it, it emits a variety of illuminating rays that reach out in different directions and heights, creat-

(Continued on Page 2)

Manager Ignorance Blamed For Staff Blues, Turnover

By Bruce Hoard
CW Staff

WALTHAM, Mass. — DP management is contributing to high industry turnover through ignorance of workers' wants and needs, according to a recent study conducted by International Data Corp.'s Information Systems Planning Service (ISPS).

Employees and management generally agree salary is the most important factor in attracting potential employees. What management fails to discern, however, is the decreased importance of salary after a DPer is hired, the study found.

"Acquiring and Retaining EDP Personnel" was based on interviews with 58 employees — programmers, systems analysts, managers and "other." "Other" consisted of DPers in areas such as customer training, data acquisition and security.

In addition, 28 employers as well as eight students were interviewed.

The report showed that DPers are strongly influenced by motivators, satisfiers and dissatisfiers when considering, accepting or remaining with a job. It also showed that employers interpret those factors differently, leading to unnecessarily high turnover rates.

Some suggestions for keeping workers happy include rewarding their technical and personal relations skills and convincing top management

(Continued on Page 8)

MVS Users Unsure How Best to Keep Up

By Tom Henkel
CW Staff

IBM's rapid-fire announcement of three releases of its MVS/SP operating system in the past six months has left users of that software wondering how to best keep up with the changes.

Users and industry analysts last week agreed that the amount of time and money a DP shop can devote to MVS updates would govern that decision.

IBM made its first attempt at giving the MVS operating system a boost in power last June. At that time it changed MVS' name from MVS/-System Extensions (MVS/SE) to MVS/System Products (MVS/SP) and announced two releases, 1 and 2. Volume shipments of Release 1 are just starting to make their way to end users, and Release 2 is slated for volume deliveries in the fourth quarter of 1981. On Nov. 12, IBM announced that Release 3 of its MVS software will be available during the fourth quarter of 1981.

How to Migrate?

The big question for current MVS users is how to migrate to Release 3. Taking each MVS/SP release in turn will probably cut down on long-range problems, because software bugs will be ironed out in a staggered fashion, IBM analysts and users agreed.

Additionally, if the enhanced MVS is installed in three pieces, the management information systems (MIS) staff will be more familiar with it. That will be a big help when a shop tries to install new applications and new IBM hardware and software. If some-

(Continued on Page 6)

Eight Comdex Visitors Die

By Deborah de Peyster
And Rory J. O'Connor
Special to CW

LAS VEGAS — More than 450 people here for the recent Comdex '80 representing about 150 companies were among those trapped for as long as six hours in the MGM Grand Hotel while poisonous gases and smoke swirled throughout the building from the inferno below.

At press time, eight persons attending or exhibiting at the Comdex show were known dead. Countless others with smoke-tinged faces milled around the conference floor with only the clothes on their backs. They were glad to be alive.

Among the 84 victims of what has become one of the worst hotel fires in the nation's history were Edward W. Herring, a product manager at Printronix, Inc. in Irvine, Calif., and his wife of only three weeks, Genese H. Bartlett Herring; a Printronix distributor, Richard Sipfle, senior vice-president of Lowry

(Continued on Page 4)

CW Photo by V. Farmer

Countless Comdex '80 visitors were rescued from the blaze at the MGM Grand Hotel in Las Vegas.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

TM reg. U.S. Pat. Off.

Editor E. Drake Lundell Jr.

Managing Editor Nancy French

News Editor Cheryl M. Gelb

Senior Editors:
Industry Marcia Blumenthal
Systems Timothy J. Scannell
Communications Brad Schultz
Software Rita Shoor
Features John C. Whitmarsh

Senior Writer:
Communications Phil Hirsch

Correspondents:
West Coast Jeffry Beeler
Washington, D.C. Jake Kirchner

Writer/Analyst Marguerite Zientara

Staff Writers Tom Henkel
Bruce Hoard
Bob Johnson

Chief Copy Editor Catherine Marenghi
Copy Editors Steve Milmore
Linda Rosenthal
Barbara T. VanScoyoc
Donovan White

Photography Editor Ann Dooley

Editorial Assistants Susan M. Blakeney
Martha Taylor

Editorial Cartoonist Jim Orton

Contributors:
Education J. Daniel Couger
Taylor Reports Alan Taylor
Human Connection Jack Stone

For Sales, Circulation and Production contacts, see inside back page.

Please address all correspondence to the appropriate department at 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153

OTHER EDITORIAL OFFICES:

West Coast: 257 Lytton Avenue, Palo Alto, California 94301. Phone: (415) 328-8064.

Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Steve Burton, IDG Publishing Ltd., 146 Clerkenwell Road, London EC1 Phone: 01-837-1222. Telex: UK-269477.

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40, Phone: (089) 34-90-61. Telex: 5215350.

Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: SECCO AA25468.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Kevin Kelleghan, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F., Phone: (905) 514-4218; (905) 514-6309.

Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-0010-4841) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1980 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* and *Computerworld Extra!* is forbidden without written permission. Send all requests to Marion Kibbee.

$1.00 a copy: U.S.— $30 a year; Canada, Central & So. America — $50 a year; Europe and Near East — $90 a year; other foreign — $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

RED TAG ABP MCC MEDIA DATA FORM

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Cullinane Interfaces IDMS, DMS

By Rita Shoor
CW Staff

WELLESLEY, Mass. — Cullinane Corp. last week announced an interface between its Integrated Data Management System (IDMS) and IBM's Development Management System (DMS) along with a data dictionary called the Information Directory (ID). ID is the latest component of its Audit Information Management System (Aims).

The IDMS/DMS interface provides IDMS data base support for users of IBM's DMS and CICS/VS software, according to a Cullinane spokesman.

It reportedly enables users to retrieve and update IDMS data base information through DMS in an on-line CICS/VS environment. Included among the facilities offered by the product are:

- Inquiry and update capabilities.
- Keyed access to specific record occurrences in a path.
- Browse capability that allows users to proceed forward or backward through record occurrences at the desired path level.
- Data from multiple IDMS record types displayed on the same screen.
- A repeat capability that allows multiple record occurrences to be retrieved and displayed on the same screen.
- Built-in interface functions such as get-first, get-next, and get-prior, which operate according to user-specified navigation paths.

Batch components of the IDMS/DMS interface are used to prepare data base descriptions and on-line components communicate with IDMS Central Version to access data base records, the spokesman explained. On-line transactions that utilize this product are pseudo-conversational in nature, he said.

Comprising the second part of the firm's announcement, the ID was designed to enhance program productivity in an audit environment, according to Cullinane. It combines a report generator with a library of audit routines to allow for management, programming, reporting, protection and control of corporate assets by auditors.

Additional ID features include:

- A facility that enables auditors to verify the completeness and accuracy of controls.
- Automatic provision of key audit information.
- Enhanced audit independence.
- Reduction in errors caused by redundant, inconsistent or erroneous data element names.
- Elimination of manual input coding.
- Facility for limiting access to corporate financial information.

Available immediately, the IDMS/DMS interface feature costs $10,000 and the ID is currently priced at $9,500. As of March 1, 1981, ID will cost $12,000, Cullinane said from its headquarters at Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.

Corrections

In the recent story "Amdahl Unveils Rivals to IBM 3081 Processor" [CW, Nov. 24], Amdahl's 470V/7 processor should have been listed as being able to handle a maximum of 32, and not 16, I/O channels. Also, in the chart accompanying the article, IBM's price for its 3081 is the cost of the processor only, with no console. And Amdahl's monthly lease price for four years for the full-scale 580-5860 is $105,100. The monthly lease price for the 5880 has not yet been released.

Stores Get Holographic Scanner

(Continued from Page 1)

ing a dense depth of fieid, an IBM spokesman said.

This increased focal depth enhances the scanner's ability to make contact with the UPC marking. Nonholographic laser scanners are limited by their shallower depth of field and thus required closer alignment with the UPC, he said.

The 3687 reportedly requires no special skills to operate and works in conjunction with five recently announced models of the 3683 point-of-sale supermarket terminal, featuring high-density memory technology.

The five models of the 3683 can be equipped with modular print stations, alphanumeric or numeric display panels, cash drawers and keyboards.

Other programs available for the 3683 generate customized store reports on its printer, build and maintain store files and provide store-to-store communication in chain store operations, the spokesman said.

First customer shipments of 3683 terminals are scheduled to begin in the first quarter of next year. Shipments of the 3687 scanner and 3683 models to which the scanner can be attached are scheduled for the third quarter of next year.

Equipment for a checkstand that includes the scanner, terminal with three print stations, a keyboard and cash drawer can be purchased for $10,033, IBM said.

This Week

IN DEPTH

The Structured Methods Dream. . . . . Follows Page 58

NEWS

Vendor Reps 'Just Tried to Help'. 4
Burroughs Slaps User with Countersuit 5
Suit Asks $1.7 Million in Damages 6
Management Found Top Source of Discontent 8
Warner Bros. Programmers Form Own Unit 9
Processing Services Expected to Grow 17%/Year . 12
Supervisor Job Called Toughest in World 13
Communications Tops Europeans' Lists 14
User Satisfaction Found Common in Europe 15
Congress Still Opposed to Nine-Digit Zip Code 16
Drucker Stresses Personal Management. 18
Carter Technology Report Points to Social Issues . . 23
IEEE Local Net Standard Expected Next Year 24
Strategics of Productivity Urged for Industry 25
MRP Viewed Slashing U.S. Air Freight Bill 26
Lure of Productivity Draws 4,500 to Info/MFG 27
Human Interaction Seen Vital to Manufacturing. . . . 28
U.S. Warned of 'Technology Trap' In Robotics. 29
FAA Drafts Plan In Case of Controller Strike 30
Optimism Voiced for 'Trusted' Future Systems 31
GE Technique Finds Faults, Restores Power 32
Twin Nuns Pool Efforts To Establish Micro Lab 33
Development Method Eases Documentation. 34
IBM Builds on Single Chip Fiber-Optical Receiver. . 36
Bell Labs Improves Glass Fiber Fabrication Rate . . 37
Turnaround Time. 41

EDITORIAL

Editorial: The OECD Privacy Guidelines. 42
'Half-Asked' Questions on Productivity 43
Taylor Report: Environment Safeguards 43
Many Sites Ignoring Disaster Recovery Basics 43
Language Battle Results in Project Collapse 44
Structured Methods Need Individual Evaluation . . . 46

SOFTWARE & SERVICES

'Grow Your Own Programmers' Advised 49
Genasys Backs DBMS, IBM 3800. 50
Course Series Slated for CICS, Vsam Users 53
Minimal Basic, Fortran Approved as Fips. 54
'FCS-EPS' Ready on DEC 55
NCR VRX Machines Run IRX Applications 56

COMMUNICATIONS

X.25 Delay Viewed Hurting Net Users. 59
Modems Feature Code-Multiplexed Design. 60

SYSTEMS & PERIPHERALS

Firm Has Smooth 4331-2 Conversion. 63
Preprocessing Data Logger Bows 64

MINIWORLD

Tax Service Indebted to In-House Mini. 65
On-Line Data Entry Turnkey Out. 66
Portable Micro Series Bows 68

COMPUTER INDUSTRY

Industry Spokesmen Welcome Reagan 69
Small Business Computer Show Well Received. . . . 69
Sotheby Computer Auction 'A Total Flop'. 71
ICL Ax Falls as Recession Hits 72
CLA, CDA Merge. 74
IDC Expects 'Staggering' Desktop Growth. 78
Univac Hints at Joining Mainframe Skirmish 79
ADVERTISING INDEX 114

ELECTION

Who got 69% of the vote?

(a) Carter ____
(b) Reagan ____
(c) Anderson ____
(d) SyncSort ____

Call (201) 568-9700.

It's sorting's Oval Office.

OVERSEAS REPRESENTATIVES—
Düsseldorf: SyncSort Technology GmbH, Tel.: 0211-480351
Johannesburg: Computing Benefits Ltd., (011) 46-521
Melbourne: Shell Co. of Australia Ltd., (03) 8400311
Milan: SYNTAX, (39-2) 87. 74. 44
Paris: CAP/SOGETI Produits, 33-1-539-22-25
Reading (UK): SyncSort Technology Ltd., 44-0734-481919
Stockholm: BRA, 46 8 88 03 00
Tel Aviv: ADVANCED TECHNOLOGY Ltd., 442697
Tokyo: Software Engineering Co., Ltd., (03) 446 1811
Utrecht: SyncSort Technology BV, 030-31-26-11

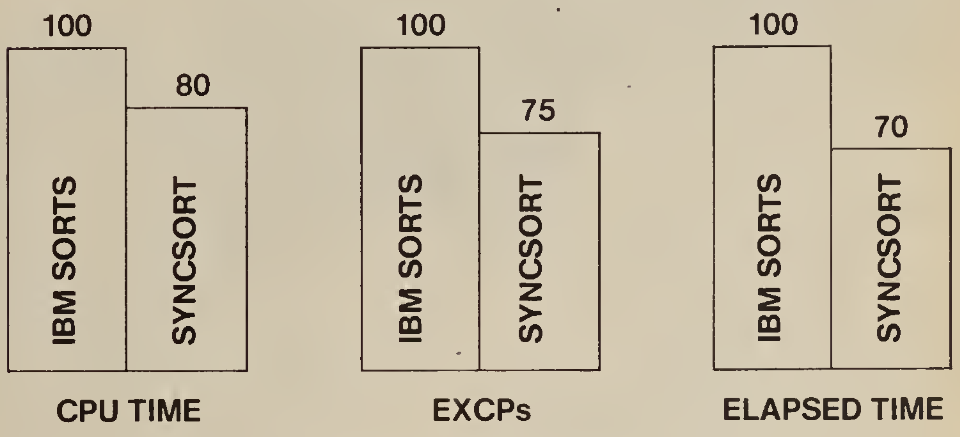
The correct answer is (d)...SyncSort. If you guessed it, congratulations! You are a very shrewd data processor indeed. So shrewd you're probably *already* a SyncSort user. A lot of people are.

SyncSort is now the sorting choice of 69% of America's major data processors, according to the 1980 annual sort-program survey conducted by the International Data Corporation. Here are a few of the reasons for our stunning electoral victory:

1. LEADERSHIP IN SORT REFORM: In less than a decade, we've succeeded in taking the sort program out of Tammany Hall and turning it into a productive, hard-working public servant.

Virtually every sorting innovation since 1971 has been introduced in a long line of SyncSort releases. In terms of resource savings, we have made sorting one of the most advanced areas of data processing.

Today, if you compare SyncSort's performance against that of the candidates of the "Hardware Party," you'll see savings like this:



2. A FAIR DEAL FOR PROGRAMMERS: Those long lines you saw outside the polling booths were programmers waiting to vote for SyncSort. They've never forgotten that we were one of the first proponents of "A Reduced Work Week for Applications Programmers." (ARWWAP)

SyncSort has been designed to take the blood, sweat, toil and tears out of sorting. It includes a host of labor-saving features like INCLUDE/OMIT, INREC/OUTREC, SUM, and others.

In typical selection-report applications or modifications, a job that would take five days using a programming language can be handled by SyncSort in *just one day.*

3. RESPONSIVENESS TO THE VOTERS: We've never forgotten who's boss. We work for the users, they don't work for us.

When our Technical Service specialists get a call, they follow it up fast and accurately. Our new TSR system (Technical Service Requests) is so good that 85% of all requests for assistance or advice are resolved within 24 hours!

Are we going to rest on our laurels? Nope, we're now hard at work on our Inaugural Address.

It's got one line that goes: "Ask not what you can do for your sort program. Ask what your sort program can do for *you.*"

WHITLOW COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Hotel guests gathered on balconies to await rescue. Some who were not so patient fell or jumped from makeshift lifelines.

Unused exhibit space in the East Hall of the Las Vegas Convention Center, site of Comdex '80, was hastily turned into an evacuation center for survivors.

Smoke billowing from the burning hotel made balconies a dubious choice for many who waited there.

Vendor Reps 'Just Tried To Help'

Special to CW

LAS VEGAS — It wasn't until about 9:30 a.m. Nov. 21 that Marge Gilette recognized the scope of the disaster that was unfolding at the MGM Grand Hotel.

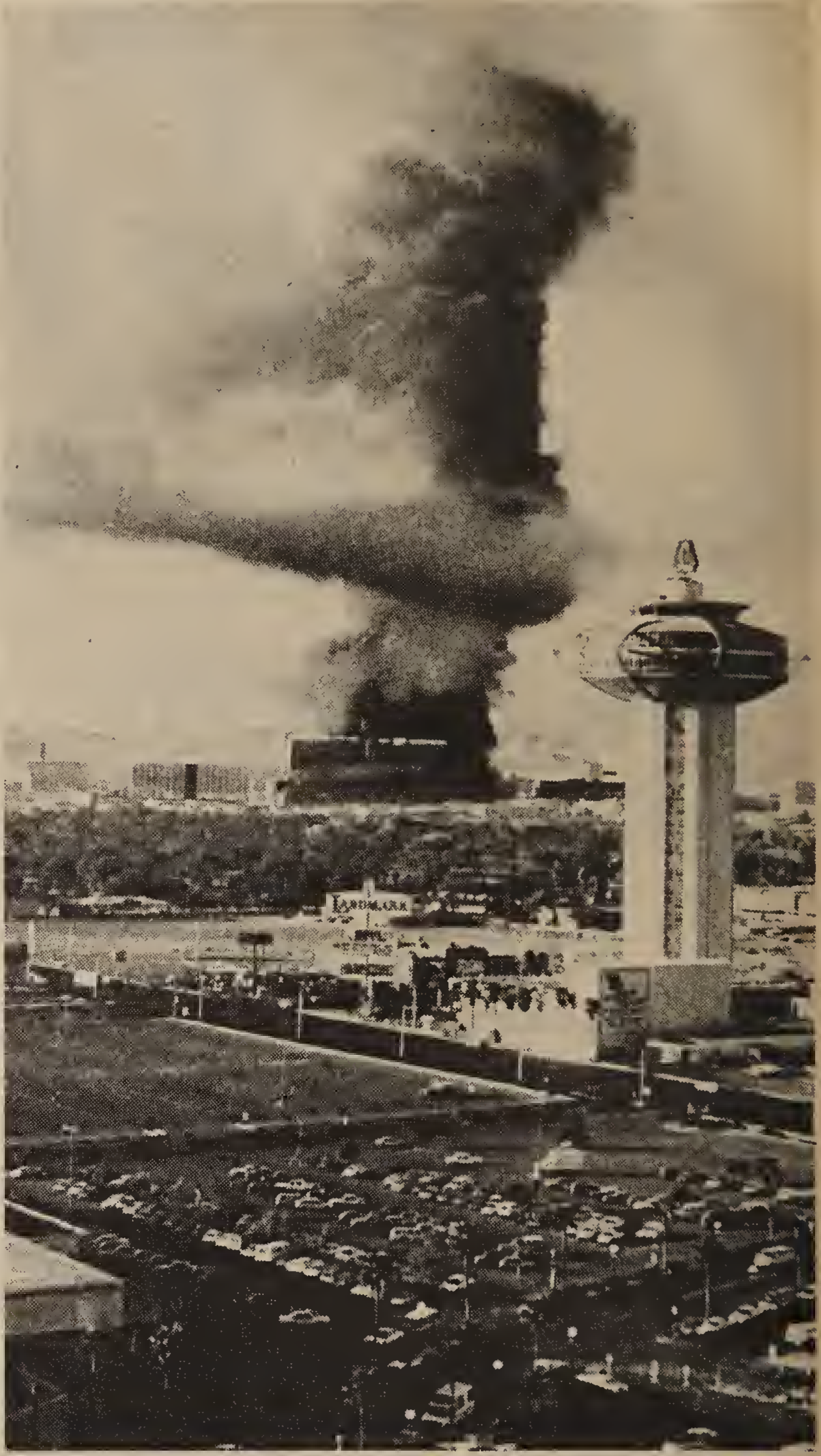
She was not alone. Most people had seen the hotel fire, as she did, on their way to the Las Vegas Convention Center, site of Comdex '80, but few realized the numbers of homeless and injured that would need help.

It was not until an associate of Gilette's received a panic-stricken phone call concerning the safety of relatives and friends that she recognized something should be done to answer the hundreds of similar questions that were flooding into the area.

Fortunately, she was in a position to help. Gilette is a market representative for Commodore Business Machines, Inc. and had at her disposal several Commodore systems brought to Comdex to demonstrate a list management system.

Within one hour, two complete systems had been hand-carried or wheeled on dollies to the east wing of the convention center and set up to process names.

Within another few hours, as the number of names increased beyond anyone's imagination, Honeywell, Inc. representatives appeared on the scene with a Level 6 computer system to further help in the listing process.



The MGM Grand, engulfed in smoke, is shown viewed from the Hilton, about two miles away, where other Comdex attendees were housed.

Together, microcomputer company and minicomputer company representatives worked out programming and data entry coordination to produce hourly, up-to-date alphabetized listings of survivors' names and whereabouts.

"We just tried to help," Gilette said. "That's what we were there for. It was a joint effort."

Eight Comdex Visitors Die in MGM Hotel Fire

(Continued from Page 1)

& Associates of Brighton, Mich.; Joseph Bell, head of engineering for Tiffany Stand and Furniture Co., of Conway, Ark.; two office machine dealers from Indianapolis, David F. Sanders, 39, and Barbara J. Sanders, 37; and two Alpha Micro dealers from Midwestern Digital Electric, David Blair Jr., 26, of Columbus, Ohio, and his partner James E. Thebeault of Mansfield, Ohio.

The Comdex exhibition was being held at the Las Vegas Convention Center, about two miles from the MGM Grand.

Convention Survivors

Survivors from the fire began straggling back to their booths on the convention floor shortly after 10 a.m. Friday, about three hours after the fire erupted in the faulty electrical system in the hotel's first-floor kitchen area.

The mood was subdued and one of disbelief as the executives who had done business in three-piece suits the day before returned to their booths that morning disheveled and dirty. Some had blankets wrapped around their shoulders.

They told of being awakened by screams or the sound of fire engines to find their rooms filling with smoke and the hallways mobbed. They spoke of the lack of warning from any fire alarm and the search for fresh air in the midst of dense acrid smoke that quickly filled the hotel.

Many who attempted to find their way down the stairway, only to be confronted with a column of smoke gases, returned to their rooms to await rescue.

The photos above and on Page 1 were taken by Victor J. Farmer, editor of Computer Business News *(CBN). Farmer, along with Deborah de Peyster, a CBN West Coast editor, and Rory J. O'Connor, CBN senior editor/software, were in Las Vegas covering Comdex '80.*

Stories Emerge

Other stories also began to emerge during the day — stories about the generosity and concern of fellow Comdex exhibitors and attendees.

A Data General Corp. exhibits manager, Bob Kneeland, never went to his booth that morning. Instead he headed to the MGM in hopes that his fire training could be of help.

A man from Onyx Systems, Inc. gave his room to four people from Corvus Systems, Inc., and many other exhibitors offered their rooms as well, in an effort to help the survivors shower and find clothes.

And Commodore Business Machines, Inc. and Honeywell, Inc. brought equipment from their booths to the evacuation center in the east wing of the convention hall. They worked through Sunday making lists of names from the hundreds of people being bused there from the hotel and from lists provided by the five hospitals aiding in the emergency.

Michael Segroves and Gordon Hoffstein of Micro-America Distributing Co. of Needham, Mass., were two Comdex exhibitors who were trapped until 9:30 on the 17th floor of the MGM. They had tried to escape, but found all the exits impassable because of the smoke. They returned to their room to wait with about 20 other residents of the floor for help.

Segroves, coughing from the smoke, described the scene as "pretty grim up there. It was hard to breathe and all the exits were smoky."

"The worst thing was the uncertainty," he said of the long wait on the room balcony.

Two hours after they were rescued, both men were manning their booth, Hoffstein still coughing and Segroves nervously smoking a cigarette.

Steve Koch of Pertec Computer Corp. said he awakened to the sounds of people screaming. By then, the smoke was so thick in the hallway he couldn't see anything and retreated to his room balcony. His room had no running water or phone and he was getting "just a little bit panicky" when the firemen rescued him.

Tom Dunn, the national sales manager for Perkin-Elmer Corp., stood with five regional managers at the Perkin-Elmer booth recounting their narrow escape. The six men were coughing, covered with smoke soot and looking for aspirin for their headaches. One of their group had inhaled quite a bit of smoke and had to be carried from the hotel.

Dunn said that they threw chairs through the window in their room to get more air and "were on the floor with our noses in the corners saying Hail Mary's."

Claims Reputation, Sales Hurt

Burroughs Hits Quality Books With Countersuit

By Tim Scannell
CW Staff

NORTHBROOK, Ill. — Burroughs Corp. has filed a $1.5 million countersuit against Quality Books, Inc. here, charging the book distributor with "false or misleading" statements about the firm's computers that have resulted in lost sales.

The Detroit-based computer vendor is seeking actual damages in excess of $500,000 and $1,000,000 in punitive damages. In addition, Burroughs is asking the court for an injunction prohibiting Quality Books from making any more statements about the company or its products.

Quality Books filed a $1.9 million suit against Burroughs about six weeks ago, charging that the vendor knowingly sold it a defective B800 computer system.

Before filing the suit, the book distributor placed ads in both the regional and national editions of *The Wall Street Journal* asking to hear from other Burroughs users who may have had similar problems [CW, Sept. 8]. To date, nearly 600 replies have been received from around the world, the company claimed.

In an answer and counterclaim to the suit, Burroughs said that Quality Books committed and continues to commit acts "with the sole, malicious intent to injure Burroughs' business, to destroy Burroughs' existing and prospective business relationships, and to coerce Burroughs to meet Quality Books' monetary demands."

Burroughs "has suffered, and is continuing to suffer, identifiable losses of sales of computer products" as well as a "loss of reputation and business good will," the counterclaim stated.

The counterclaim also categorically denied nearly every accusation made by Quality Books against Burroughs in the book distributor's original suit. Also, while the six-count claim, filed in federal court in Chicago, specified that Burroughs' sales were "identifiably" hurt, the company did not say just how severely sales figures were affected.

"I think it's an act of intimidation," Tony Leisner, Quality Books' general manager, said of Burroughs' countersuit. In effect, Burroughs is saying "Hey, all you little companies out there, just take your licks and shut up, or otherwise we'll sue your pants off!"

At least 50 lawsuits have been filed against Burroughs by other unhappy B80, B800 and B700 small computer users, Quality Books' attorney Marvin N. Benn has claimed. And "it may get larger," he said, adding that he is presently representing eight disgruntled users in suits against Burroughs.

A Burroughs spokesman last week refused to acknowledge Benn's figures or state exactly how many legal actions are pending against the company for the B800 computer.

Quality Books' Leisner contended that it is the deluge of letters generated by the unconventional ad and the resultant flurry of law suits by other dissatisfied Burroughs users that have caused the vendor to seek an injunction against the book distributor.

Burroughs "is really looking to sweep this thing under the rug," he claimed. "One little company having a bad computer is not news. What is news is that 600 companies responded to the ad or articles about it."

Meanwhile, both Quality Books and Burroughs are gearing for an all-out legal war that could take some time to decide and whose outcome would reflect on the vendor's reputation in the small business computer community.

Burroughs is reportedly gathering written praises of its small business systems from present users and digging up past bouquets from the firm's files. The firm is also preparing filmed testimonials from satisfied users and drilling its sales force on how to respond to any aspersions cast by the Quality Books affair.

The flack created by the small publisher comes at a bad time for Burroughs, particularly since earnings have been plummeting since the end of last year. In the third quarter this year the company's earnings fell 32% and total earnings in 1980 probably won't exceed $6 a share, compared with $7.45 a share in 1979, according to W. Michael Blumenthal, Burroughs chief executive officer.

In addition, any shadows that mar the reputation of the firm's B800 computer line could affect the sales of Burroughs' B900 series of computers, which were brought out as replacements for the B800 line. At the moment, the company is shipping one B800 series computer to every B900 model, according to published reports. Burroughs has about 20,000 small business systems installed in the field.

On the other front, late last week Quality Books was expected to file an answer to Burroughs' counterclaim denying allegations of interference of business opportunities and contractual obligations and any intent on its part to harm the firm, the publisher's attorney said.

When asked about the wisdom of placing the experience-soliciting ad in a national newspaper — a move that did not especially please Burroughs execs — Benn called it a "beautiful move, in view of the facts of the case."

For every reason you have to choose CICS, there's an even better reason not to.

Not long ago, everyone had a very good reason for electing to use IBM's CICS TP Monitor. There simply wasn't a good alternative. But since the advent of SHADOW in 1973 and ultimately SHADOW II in 1975, there's every reason to reconsider. Look for example at the reason many people cite for choosing CICS... compatibility with IBM hardware. A good reason, indeed, but in truth...
SHADOW II is even more compatible. And well it should be. INSAC Software's business is, after all, exclusively software. So all our energies are put toward developing, improving and enhancing systems software to make the best use of IBM hardware. In short, in this area, we can out IBM IBM.

For those who reason that it's simply easier to buy and install a TP Monitor from the same people you buy the hardware, we'd like to point out this.

SHADOW II's technical consultants know IBM hardware as well as IBM technical consultants. And because SHADOW II is such an advanced TP Monitor, it can typically be installed in less than one hour. Compare that to the time it takes to install CICS.

And while there seems to be a great deal of wisdom in reasoning that technical support and maintenance will be better for CICS by virtue of its being an IBM product, consider the reality of the matter.

SHADOW II has, in the first place, far lower technical support requirements than CICS. But when such support or maintenance is required, an ample and highly capable support team stands ready on a moment's notice to provide necessary service. In fact, present users and objective evaluators alike cite this area as one of SHADOW's greatest strengths. In addition, our technicians provide four days of intensive, on-site, classroom education in using the SHADOW package.

SHADOW II

Finally, for those who reason that despite the problems which CICS has become notorious for, it is still a risk to buy a TP Monitor from a company other than IBM, we would like to summarize by saying this:

SHADOW II has long continued to outperform CICS on virtually every important criteria. And while IBM has made attempts at correcting problems, CICS performance stills falls dramatically short of SHADOW II in memory usage, CPU utilization, response time, application development time and programmer training time. In short, no matter how IBM has added to, taken away, or otherwise repackaged their system...It's still CICS. And therein lies the problem.

So if we haven't already given you reason enough to consider SHADOW II for your TP Monitor, we welcome the opportunity to give you more. And it just doesn't seem reasonable not to let us.

INSAC SOFTWARE, INC.
2300 Peachford Road
Suite 3235
Atlanta, Georgia 30338
(404) 452-7676

I want to learn more about SHADOW II

NAME ADDRESS
TITLE CITY STATE ZIP
COMPANY PHONE HARDWARE OPERATING SYSTEM

Suit Cites Program Theft, Asks $1.7 Million Damages

By Marguerite Zientara
CW Staff

ATLANTA — Programmed Closing Systems, Inc. (PCS), a small real estate- and mortgage-related software firm here, has filed a $1,750,000 lawsuit against Minnesota Title Financial Corp. (MTF) of Minneapolis, charging theft of a program that PCS had licensed to MTF.

Filed in U.S. District Court here, the suit alleged that MTF appropriated the program with the intent to disseminate it to "unauthorized persons" for its own profit.

MTF allegedly entered into a contract on Jan. 31, 1978 for "multiple-sale" rights to PCS' Mortgage Information and Servicing System (MISS), according to PCS President Krishna Srinivasa.

Under the contract, MTF agreed to pay PCS royalties on the program as MTF gradually disseminated duplicates of it to MTF's "several" regional offices, Srinivasa claimed. In addition, MTF allegedly agreed not to modify the software in any way.

However, MTF subsequently modified the software and then claimed it was not responsible for paying royalties on the package that it made accessible to personnel in various locations via terminals, the suit alleged.

MTF is "supposed to tell us and ask our permission in writing where they're going to use the software and they didn't inform us," Srinivasa said. "Every time they use the terminal, they should let us know so that we can keep track of where all the software is being utilized.

"Because it's on-line software, they may be in Alaska and be using the same software there," he added.

The program in question is a fully automated loan processing, secondary marketing, document preparation, title policy and binder preparation and loan servicing system, he explained.

Further Charges

The suit also charged that last August, PCS was "confronted by" MTF representatives who said that unless PCS would waive the "Restriction on Disposition or Use of Program" and "Covenant Against Disclosure," contained in the software license agreement, MTF "would harass [PCS] by instituting spurious legal claims against [PCS] and, further, would disparage [PCS'] product and discourage other companies from doing business with [PCS]."

In addition to charges of larceny of trade secrets and breach of contract, the suit alleged that MTF is guilty of product disparagement, defamation and fraud.

"This lawsuit will have a major impact on the software industry since this will decide the issues on proprietary rights and trade secrets in software," Srinivasa said.

The suit focuses on "people who take software and make little modifications and then say it is theirs," he added. "Small software companies cannot fight with the bigger companies . . . and I feel strongly that it should be prevented.

Besides the general damages of $1,750,000, the suit seeks an injunction to prevent further use of the program by MTF, as well as an accounting of any profits attributable to allegedly unauthorized use, and punitive damages in the amount of $2,500,000.

Reached by telephone the day after Minneapolis Title was served with the suit, an MTF spokesman explained the company's president was conferring with outside counsel and was expected to issue a statement late last week, after *Computerworld's* press time.

MCBA Wins Software Case

GLENDALE, Calif. — After a three-year battle, Mini-Computer Business Applications, Inc. (MCBA) has received a final judgment and permanent injunction against Business Information Systems, Inc. (BIS) of Hillsborough, Fla., in a proprietary rights software case.

In the spring of 1978, MCBA filed suit against BIS for misappropriation of MCBA's software for use on Digital Equipment Corp.'s 310, 340 and PDP/11 hardware systems, according to an MCBA spokesman.

The use of the "improperly acquired" copies of MCBA packages by BIS was judged by the Court of Tampa, Fla., to have been a misappropriation of MCBA proprietary software, the spokesman said.

In addition, the marketing of the software by BIS was argued to be unfair competition, which was supported by the court Oct. 17. The court decree enjoined BIS from using, selling or leasing any software developed by MCBA or derived from MCBA software for a period of not less than 10 years.

BIS was further enjoined from advertising or disclosing any information about MCBA's software. Furthermore, BIS was ordered to provide a list of all names and addresses of people to whom BIS had furnished any of MCBA's software, advertising material, price lists and other materials.

BIS was ordered to return all MCBA software and materials of MCBA, the spokesman added. A damages hearing against BIS is set for Jan. 12.

MCBA is currently pursuing four other alleged offenders, the spokesman noted, and is offering a license for one software package to any person reporting knowledge of illegal use of its software, upon successful prosecution of the illegal user.

Industry Analysts Assess IBM Strategy for MVS/SP

By Tom Henkel
CW Staff

GREENWICH, Conn. — Why all the releases of MVS/SP?

Rumors have been flying since IBM's Nov. 12 announcement of MVS/SP Release 3 and the 3081 processor, but at least two industry analysts here said last week that IBM has a few more tricks up its sleeve.

IBM announced three releases of MVS because the firm is developing its hardware at a faster pace than its software, Dave Stein, an analyst with The Gartner Group, theorized. Since IBM did not want to postpone announcing major products like the 3380 and 3375 disk drives and the 3081 processor, the computer vendor was forced to announce software support for those products in a staggered fashion.

Further, IBM's announcement of the 3081 without a native operating mode suggests another operating system may be on the horizon. Users can expect that new operating system to have more of the characteristics of DOS/VSE such as increased modularity. The new operating system will offer better performance with less overhead than MVS, he claimed.

To stay ahead of the plug-compatible mainframe (PCM) vendors in the marketplace, IBM has to make drastic changes in its operating software, Stein commented.

When the changes will come, however, is the big question. Bob Fertig, president of Advanced Computer Techniques, said IBM has some big performance changes lined up for MVS/SP Release 3 that will send PCMs like Amdahl reeling. Release 3 is still 370-era technology and if, as Stein contends, the successor to MVS transcends the 370 era, the changes will probably come soon before IBM announces more models of its H series — of which the 3081 is said to be a mid-range model.

With that in mind, MVS/SP Release 3 may be the last of the 370-era software. The next release will probably be the 3081 native mode, Stein said.

MVS/SP Users Unsure How to Keep Up

(Continued from Page 1)

thing goes wrong, one user explained, it will be easier to pinpoint the problem if the staff knows the operating system.

Installing each of the three releases, however, is expensive — for many users an unaffordable luxury. One MVS user estimated it would take his organization two to three months to install and test Release 1 (assuming the installation and testing is being done during nonpeak hours). He estimated it would take another two to three months to install Release 2 and three to four months to install Release 3.

Full Disk Speed

MVS/SP Release 1 is the entry path to the new levels of MVS. The biggest advantage of installing Release 1 is it allows use of IBM's bigger and faster 3380 and 3375 disk drives at full speed. Current MVS users would have to install a speed-matching buffer, or software that slows the new disk drives to a level that can be managed by the operating system. But since neither the 3380 or 3375 is available to end users yet, analysts like The Gartner Group, Inc.'s, Dave Stein and Advanced Computer Techniques Corp.'s Bob Fertig said most MVS users planning to use those devices will probably migrate to Release 1 before delivery.

Another advantage offered by a quick migration to MVS/SP would be readiness to install new program products that might be announced to run only on newer releases of MVS.

As one MVS user put it, if management decides it wants a new IBM program product, installation will be much easier if the MIS department doesn't have to bring up a new program product and a revised operating system at the same time.

The most likely candidate for elimination from a user's upgrade plans is MVS/SP Release 2. Analysts agree the only difference between MVS/SP Release 2 and Release 3 is Release 3 will work better. IBM has promised a throughput improvement in Release 3, but it won't say how much the improvement will be until the first customers receive copies of the release.

Furthermore, Release 2 will be available for volume shipments in the third quarter of 1981 — probably around June. Release 3 will be available for volume shipments in the fourth quarter — probably in November or December.

So why bother with Release 2? From a user's standpoint, it's clear; Practice may not make perfect, but it helps. One large MVS shop plans to bring up MVS/SP Release 2, but never put it into production. The plan is the shop will have hands-on experience on what changes have to be made to accommodate MVS/SP Release 3, the user said.

Another big advantage of Release 2 is cross memory — an architectural extension that allows communication among address spaces in an MVS/SP-JES2 environment. A key ingredient to cross memory is global resource serialization (GRS), an extension to the MVS ENQ/DEQ serialization function that allows ENQ/DEQ control blocks to be removed from system virtual storage and placed in a private address area. That means in a multisystem environment, systems can be connected by channel-to-channel adaptors and share resource serialization.

In addition, GRS will run in its own address space and is protected against accidental modification. In short, GRS provides information about an object without requiring an application to look at the internal ENQ control block, according to IBM.

The advantage of cross memory and GRS is it uses up less virtual storage.

The bad news about GRS is it may require reprogramming, or at least regenerating, some applications to use it at peak performance — Release 2 is an excellent vehicle to make those kind of programming changes, according to some users.

For users who need more virtual storage, Release 2 may not help much, since Release 3 may well be on the market before users have a chance to install and test Release 2, both users and analysts contend. But a switch to Release 2 may give those users a jump on implementing Release 3.

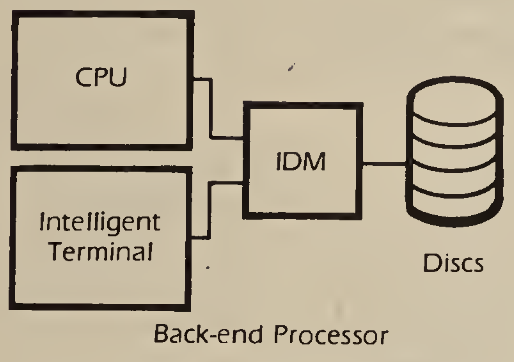
DBMS In A Box

The fastest possible Database System... available at the lowest price.

Britton-Lee has packaged a complete database management subsystem in one low-cost box. We call it the Intelligent Database Machine, or IDM.

The IDM promises more throughput performance at far less cost than existing software-based database management systems. Like a communications front-end, this back-end processor is a dedicated peripheral that offloads a specific host task. Unlike conventional DBMS software, it is a self-contained system that does not use host resources. Host independent, it gives heterogenous hosts simultaneous access to a common database and is not affected by changes in the host configuration.

Although IDM incorporates all the features found in the best software-based DBMS (transaction management, concurrency control, protection, backup and recovery), special-purpose hardware and software handle data management jobs at an order of magnitude faster than general-purpose machines. And while IDM is quick-searching through the database, your host computer or terminal can do other work. The key is putting a relational database on a hardware/software optimized processor.



High Performance

Utilizing special purpose hardware, IDM operates at ten million instructions per second. IDM is specially designed to support very high transaction rates found in many business environments. IDM can process complex transactions that span an entire database and support multiple databases of up to 32 billion bytes.

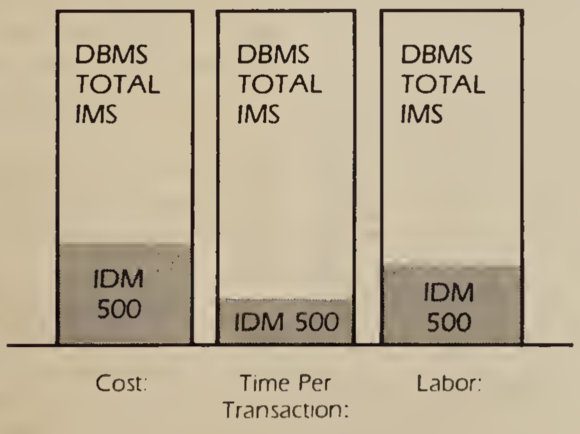
Lower Cost

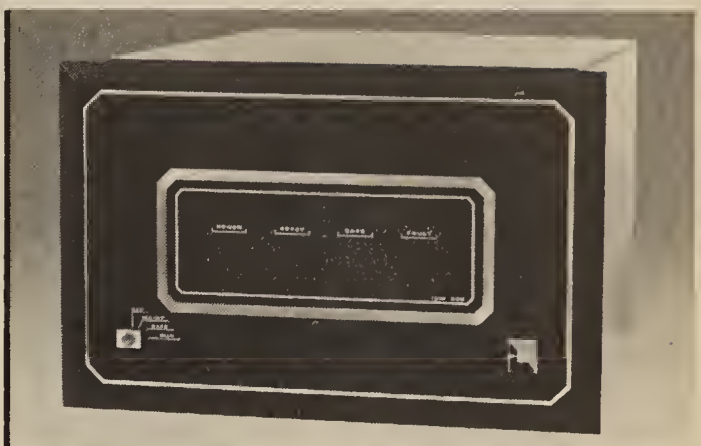
IDM is priced lower than software-based database management systems. Special purpose hardware enables IDM to run faster than systems costing ten times as much.

Less Overhead Support

A non-procedural language gives non-programmers direct access to the database. Many applications require no programming. When programming is desired, the high level relational language simplifies development and maintenance. Estimated savings in programmer time vs. traditional methods is 10 to 1.

Compare IDM and conventional DBMS approaches. Better performance. Lower capital investment. Lower overhead support cost.





IDM 500 Advantages

Costs less than software only systems.
Offers more throughput than any available DBMS for typical applications.
Provides DBMS capability to any size host.
Maintains host independence.
Supports multiple heterogenous hosts.
Uses relational data model
  /Requires less programming effort.
  /Supports high-level language interface.
  /Permits impromptu data searches.
  /Maintains independence of application software from database changes.
  /Supports stored inquiries.
  /Allows custom views of the database.
  /Permits non-procedural access to data.

Write Britton-Lee about your application, we'll send you a collection of informative literature. There is a high performance, low cost alternative to slow, complicated DBMS software.

/First in eight-inch Winchester disc storage
/First in database machines

Britton Lee, Inc.

90 Albright Way
Los Gatos, California 95030
(408) 378-7000

90 days, ARO, beginning at $50,000

TMIntelligent Database Machine, IDM, Intelligent Database Language and IDL are trademarks of Britton-Lee, Inc.

Among DP Personnel

Management Found Top Source of Discontent

By Bruce Hoard
CW Staff

WALTHAM, Mass. — Although many employers blame high salary demands for their inability to retain DP personnel, a sampling of those employees shows poor management as the primary source of discontent.

That was one of many findings published by the Information Systems Planning Service (ISPS) of International Data Corp. in a recent study entitled, ''Acquiring and Retaining EDP Personnel.''

Three Factors

ISPS reached its conclusions by studying three basic tools: motivators, satisfiers and dissatisfiers.

The report defines motivators as ''those specific impulses a person feels that influence the person to initiate a course of action.'' For instance, when passing a restaurant, a person may be motivated to stop and eat.

''Satisfiers are those forces which make a current situation pleasant or rewarding, while dissatisfiers do just the opposite. Such forces can work only after a situation has been entered into, and thus differ from motivators, which function primarily before the fact,'' the report noted.

Undesirable Aspects

Programmer/analysts, systems analysts, managers and ''other'' were asked about the least desirable aspects of the company or management at their present job. They were also asked what factors were most often ignored or fouled up by any DP employer.

In response to the first question about dissatisfiers, three of the four groups cited ''poor management,'' with programmer/analysts picking ''little chance to advance.'' On the second question, ''poor management planning'' was cited twice, along with ''management insensitivity to workers' needs.''

Overall responses included poor management, poor company planning, little chance to advance, poor facilities or equipment, poor benefits, poor pay, politics, personnel management system and little company commitment to DP.

Positive Side

On the positive or satisfier side, the same people were asked about the most desirable aspects of their current job's management, factors contributing to job satisfaction and the most important considerations in staying with a job.

Three of the four groups listed ''work atmosphere'' as the most desirable aspect of their present job, while managers listed it second behind ''variety of work.''

''Feeling of accomplishment'' topped the factors contributing to the job satisfaction response list with all but systems analysts, who had it second behind ''company management.''

There was only slightly less unanimity on the question of most important considerations with staying with a job. Systems analysts and ''other'' agreed that ''opportunity to advance'' was most important, while that response was second in the minds of programmer/analysts and managers. Those two groups cited ''increased expertise/training'' and ''salary,'' respectively.

Overall Response

Overall response to the three questions relating to satisfiers and including most desirable aspects of a current job, factors contributing to job satisfaction and the most important considerations in staying with a job were feeling of accomplishment, good management, good work atmosphere, good salary, recognition, responsibility, chance to advance, challenge, chance to increase expertise, user contact and quality coworkers.

The fact that salary had little bearing on any of the questions concerning job dissatisfaction reflects the study's assertion that incentives for accepting a job are not always the same as those for staying with a job.

That argument is further supported by examining the answers to these two questions: What are the factors making an employer most attractive and what are the most important considerations in choosing a job? It is in these areas that salary became much more important.

Salary Top Motivator

When it came to most important considerations in choosing a job, ''salary'' was the most important motivator with each group except ''other,'' which had it second to ''chance to advance.''

As far as factors making an employer attractive were concerned, salary was number one with programmer/analysts and managers, but tied for third with systems analysts and fourth with ''other.''

Systems analysts cited ''benefits'' and ''location'' first and second, while others ranked ''opportunity to advance,'' ''work environment,'' and ''location'' and ''company management'' (tie) ahead.

The overall response for these two questions were salary, chance to advance, work environment, benefits, location, facilities, management, company reputation, job responsibility, recognition, commuting distance, quality of coworkers, quality of work and minimum business travel.

Of course, all the opinions mentioned are those of employees. As we shall find out next week, employers frequently have different perspectives on the same questions, according to the study, which costs $3,500 from IDC at 214 Third Ave., Waltham, Mass. 02154.

Selective Service Suffers Computer-Match Setback

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Selective Service System has suffered what draft registration opponents hope is a setback in its plans to use computer-matching techniques to track down draft resisters.

A federal judge here last Monday ordered the service to stop requiring registrants to supply their Social Security numbers. Registration opponents fear the numbers would make it easier for the government to match registration files against driver license files and other such lists of nonregistrants [CW, Sept. 29].

The ruling came in a suit brought by the American Civil Liberties Union (ACLU) challenging the Selective Service requirements that draft-age males disclose their Social Security numbers. According to the ACLU, requesting the numbers violates the Privacy Act. U.S. District Court Judge Gerhard Gesell agreed with the ACLU, ruling the Selective Service has no legal authority to request the numbers as a condition of valid registration. He ordered the service to stop requiring disclosure of the numbers and to not use the numbers already collected.

No Immediate Reaction

The Selective Service had no immediate reaction to the ruling, saying its legal counsel was still studying the decision.

As of last Tuesday, the service had not decided whether to appeal Gesell's ruling.

In any case, Joan Lamb, Selective Service spokesperson, told *Computerworld* the agency has not finalized its draft registration enforcement program. ''We had been in contact with the [the Department of] Justice and been discussing it,'' she said, ''but we have to wait until the new administration has its people in and they can have their input into it.''

The service has not begun to collect lists to match against registration files at this point, she added, although as early as two months ago, the agency had indicated computer-matching techniques would be used to find nonregistrants.

Management Ignorance Hit For High Staff Turnover

(Continued from Page 1)

of DP's importance to organizational success.

Another area where employer perceptions run askew of employee expectations is the need to pay more attention to employees' advancement opportunities, work environment, job facilities and performance recognition.

Antidotes to employee dissatisfaction in these areas include emphasis on company benefits and career potential, the creation of a long-term managerial development and acquisition program and an effort to show that promotion and salary increases are based on performance.

Retaining Workers

The report also advises employers on how to acquire and retain workers in areas where their perceptions are the same as would-be employees.

Specific problems addressed are the raiding of DP personnel by other companies, ensuring worker motivation and dealing with workers' demands for increasingly costly and comprehensive benefits.

Beating raiders requires a ''sell job,'' according to the study. The idea is to emphasize company benefits and career potential, grant more worker responsibility and stress the need for workers to stay and fully learn the business before moving on.

Look at Records

The best way to ensure worker motivation is by scrutinizing previous employment records as carefully as possible.

''. . .a person's work history can often tell volumes about their work habits, strengths, weaknesses and potential problem areas,'' the study claims. ''Thus a person who has left previous jobs for reasons that the interviewer questions or cannot understand may not be a good risk as an employee.''

It goes on to suggest that successful employee retention and correct matching of company and worker goals go hand in hand.

Dealing with workers' demands for increasingly expensive and comprehensive benefits can best be done through three channels: Employer emphasis on the benefits of a company's location; emphasis on career potential; and concentration on drawing employees from local schools.

Less Costly Benefit

A good location ''can be used as a force to de-emphasize those more controllable costly benefits with which workers may be dissatisfied,'' the study asserts.

Selling the employee on career potential means convincing him that down-the-road benefits are more significant than short-term deficiencies.

Lastly, recruiting from local schools ''offers the chance for an employer to form a worker's perceptions and expectations about the industry.'' The idea is to minimize dissatisfaction by hiring an employee with little or no comparable experience.

Terminals Free On Trial Basis

WHITE PLAINS, N.Y. — Free hardware from IBM? It's true. IBM is offering its 3279 color CRT terminals and 3101 and 3102 printers on a free trial basis so users can see the difference color makes.

In what appears to be a new marketing strategy, IBM is willing to let its users try out the I/O devices for a 15-day test period in the case of the 3101 and 3102, and for an unspecified period for the 3279, according to IBM.

The 3279 is available through the firm's branch offices and the 3101 and 3102 are available through IBM's National Marketing Center in New York, the firm said.

COMPUTERWORLD

. . . the one weekly newspaper that's designed to fulfill your unique "need to know" . . . the one newspaper that can give you all the current information you need to benefit you, your organization and your career progress . . . 52 weeks of incisive news, commentary and special reports . . . subscribe today, use the attached postage paid order form.

☐ ***Please enter my subscription***
(details on back)

☐ ***I'm already a subscriber, but I'd like you to change my:***
- ☐ ***address***
- ☐ ***title***
- ☐ ***industry***
- ☐ ***other***

My current mailing label is attached and I've filled in new information on the other side

Put old label or label information here

Please send me COMPUTERWORLD for one year. RATES: United States—$30 Canada, Central & South America—$50
Europe and Near East—$90 Other Foreign—$150 (Airmail Service)

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: ______ Expiration Date: ______

First Initial		Middle Initial		Surname
Your Title				
Company Name				
Mail To:				
City		State		Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld.*

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY

- **10** Manufacturer of Computer or DP Hardware/Peripherals
- **20** Manufacturer (other)
- **30** DP Service Bureau/Software/Planning/Consulting
- **40** Public Utility/Communication Systems/Transportation
- **50** Wholesale/Retail Trade
- **60** Finance/Insurance/Real Estate
- **70** Mining/Construction/Petroleum/Refining
- **75** Business Service (except DP)
- **80** Education/Medicine/Law
- **85** Government - Federal/State/Local
- **90** Printing/Publishing/Other Communication Service
- **95** Other: ______

TITLE/OCCUPATION/FUNCTION

- **11** President/Owner/Partner/General Manager
- **12** VP/Assistant VP
- **13** Treasurer/Controller/Finance Officer
- **21** Director/Manager of Operation/Planning/Administrative Service
- **22** Director/Manager/Supervisor DP
- **23** Systems Manager/Systems Analyst
- **31** Manager/Supervisor Programming
- **32** Programmer/Methods Analyst
- **41** Application Engineer
- **42** Other Engineering
- **51** Mfg Sales Representative
- **52** Other Sales/Marketing
- **60** Consultant
- **70** Lawyer/Accountant
- **80** Librarian/Educator/Student
- **90** Other: ______

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Framingham, MA 01701

Detach here, fold, and place in post-paid envelope attached through binding.

Warner Bros. Programmers Secede From Clerical Union, Form Independent Unit

By Jeffry Beeler

CW West Coast Bureau

BURBANK, Calif. — A programming department that had belonged to a clerical labor union for roughly 30 years recently won federal government approval to withdraw from the union and form its own separate bargaining unit.

The case involving Warner Bros., Inc.'s programming staff is believed to mark the first time that the National Labor Relations Board (NLRB) has permitted dissatisfied computing professionals to secede from an established union and provide their own representation.

Most of Warner Bros.'s rebellious programmers see the formation of their independent union as just the first phase in a long-term drive toward total deunionization.

By this time next year, the employees hope to have abolished their newly formed organization, known as the Warner Bros. Programmers Guild (WBPG), and to have severed their last tie with the organized-labor movement, according to Chris Brooks, one of the firm's system programmers.

The exodus from the programmers' original union, known as the Warner Bros. Office Employees Guild (WBOEG), was climaxed last summer when the workers persuaded the NLRB to endorse a petition calling on the WBOEG to release its hold on the company's computing professionals.

In accepting the programmers' petition of decertification, the NLRB paved the way for the employees to hold an election to decide whether they would continue to let the WBOEG represent them.

The election has since taken place, and the programmers voted overwhelmingly to leave the WBOEG and organize their own independent bargaining unit.

Years of Discontent

The revolt of Warner Bros.' programming staff ends several years of growing disaffection with the previous union, which consists primarily of clerical workers ranging from secretaries to script readers.

The programmers' discontent with the WBOEG stemmed from several sources. For one thing, the employees resented being assigned to the same labor union as clerical personnel, with whom they feel they have little commonality of interest.

"There's a stigma associated with belonging to a craft organization, particularly one that's considered a nonprofessional craft," Brooks explained. "Our programmers have found that, when they're out gathering data or designing major systems, top management treats them differently if it perceives them as craft workers rather than as professionals."

Another reason the programmers objected to their WBOEG membership was that it denied them access to several of the company's lucrative fringe benefits and seriously hindered their efforts to negotiate salary increases, Brooks added.

Motivated by these and other perceived grievances, the programmers began during the mid-1970s to seek their independence from union control, but their efforts consistently ended in failure, Brooks recalled.

Decertification Process

Last Feb. 13, the employees for the first time presented the NLRB with a petition of decertification. In essence, the petition argued that programmers are members of a profession and thus deserve to be classified differently from most clerical workers.

On Feb. 28, the NLRB opened a two-day hearing to consider the programmers' position, and last July — after several unexpected delays and complications — the federal agency released its final conclusions.

On most of the petition's key points, the NLRB came down squarely on the side of the programmers. The agency agreed with the employees' assertion that programmers require a high degree of technical training and that they therefore perform a fundamentally different job from most office personnel.

The NLRB also agreed that, because of the highly technical and specialized nature of their work, programmers cannot justifiably be forced to belong to the same labor union as nontechnical clerical workers.

Half a Loaf

On the other hand, the agency stopped short of giving the decertification petition its unconditional approval. The organization rejected the petitioners' contention that programmers are members of a profession and denied the employees' request to be reclassified as nonunion personnel, Brooks said.

The latter rejection dealt the petitioners' cause something of a setback. Most of the 26 members of Warner Bros.' programming staff had originally hoped their union election would give them an opportunity to choose among three ballot options: continued membership in the existing WBOEG, recertification as members of the newly formed WBPG or exemption from any form of union control.

But the NLRB limited the ballot options to just the first two items and thus ensured that, regardless of how the programmers voted, they would continue to have some form of union representation, Brooks said.

Despite the NLRB's unfavorable ruling on the ballot question, the programmers still stand an excellent chance of achieving their ultimate goal of deunionizing themselves entirely. Next summer, the employees plan to call for another union election by filing a second decertification petition with the NLRB.

The follow-on election most likely will decide whether the programmers should remain in the WBPG or whether they should dissolve the union and proclaim their independence, Brooks explained.

If the balloting were held today, most of the employees would probably vote in favor of independence, Brooks said.

The New Standard For PDP-11 Disk System Technology

Check with us before you buy, because we can beat all prices!

Know All the Hidden Costs

Only System Designed Just for PDP-11 Family
Designed exclusively for DEC's UNIBUS or MASSBUS CPU's. On the UNIBUS, it's just one card that plugs into any spare SPC slot. On the MASSBUS, four cards plug into any spare existing RH70 standard back plane.
Same Disk Drive as DEC RM02-03, RP06 and RM04-05
We use the same disk manufacturers as does DEC. The RM02-03 is the 9762 CDC 80MB and the new RM04-05 300MB is the CDC 9766. Only the LOGO is different.
Transparent to All DEC Software, Diagnostics and Drivers
You bet! Use your existing Software. . .no change needed. Runs all DEC's Diagnostics plus has its own. Fully emulates DEC disk Drivers.
Worldwide Installation and Maintenance
Through Data Systems Services, maintenance and installation is provided via CDC for both Drive and Controller. We also offer full PDP-11 system support.
Full Media Compatible?
That's right! You can read or write on our drives. Put it on DEC's and it will play or vice versa. TRULY MEDIA COMPATIBLE.

DRM02-3 80MB Slave
DRJM02 80MB + Controller
DRWM03 80MB + Controller
DRJM04-5 300MB Slave
DRJM04 300MB + Controller
DRWM05 300MB + Controller
RJM07 600MB + Controller
RWM07 600MB + Controller
RM07 600MB Slave
DRP06 200MB Slave
DRWP06 200MB + Controller
DTU45
DTU77
DTU125
Line Printers
Memories
11/34 → 11/70, VAX
Systems

OEM Discounts Available

(714) 770-8024

23901 Remme Ridge Rd.
El Toro, CA 92630

DATA SYSTEMS SERVICES

PDP and DEC are registered trademarks of Digital Equipment Corporation

Processing Services a Whole New Ball Game

(Continued from Page 1)

At the opposite end of the spectrum are companies that concentrate wholly on one market niche. The highly successful Shared Medical Systems provides hardware systems and a myriad number of applications to more than 500 hospitals. Another highly specialized firm is Quotron Systems, Inc. that offers stock quotations via a private network.

Rather than going to either one of these extremes, savvy service firms are beginning to concentrate in four or five niches, offering a wide range of applications for the markets they serve, Berkeley noted.

The processing services market is expected to grow a healthy 17% annually. Story on Page 12.

"Users of computer services have the right to expect more sophisticated solutions to their problems," remarked Bernard Goldstein, a partner in Broadview Associates, Inc., a firm specializing in mergers and acquisitions in the computer services industry.

Besides specializing, processing services firms are broadening the environment for their products. One method is to push processing into a software environment, observed STSC's Cook. This way vendors can offer their products in a remote environment and, at the appropriate time, can move the application to the user's in-house system. This allows the user to try out the product on a time-sharing basis, reducing the risk of acquiring new products.

Although this new marketing tactic may nibble away part of the firm's processing services revenues, it creates new opportunities for the company, Cook reasoned.

End of Era

Apparently the days of offering only processing services is coming to an end. Cook is bullish on processing service vendors acquiring licenses to market software packages independently of processing offerings.

National CSS, Inc. is representative of the growing number of companies that make their products available both in a remote mode and bundled with hardware provided by the company.

Industry Spotlight

U.S. COMPUTER SERVICES COMPANIES WITH 1979 PROCESSING REVENUE EXCEEDING $50 MILLION[1]

	Estimated 1979 Revenue (in millions)	Estimated Market Share
Control Data Corp.	$420	7%
Automatic Data Processing, Inc.	409	7%
General Electric Information Systems	290	5%
Tymshare, Inc.	160	5%
United Information Systems, Inc.	138	3%
McDonnell Douglas Automation Co.	135	2%
Computer Sciences Corp.	129	2%
NCR Corp.	93	2%
Bradford National Corp.	89	2%
National CSS, Inc.	77	1% or less
Bank of America[2]	70	1% or less
Comshare, Inc.	67	1% or less
Mead Data Corp.	65	1% or less
Boeing Computer Services Co.	62	1% or less
TRW Information Systems	55	1% or less
University Computing Co.	60	1% or less
Xerox Computer Services	60	1% or less
National Data Corp.	54	1% or less
Trans Union Systems Corp.	50	1% or less
First Data Resources	50	1% or less
Bunker Ramo Corp.	50	1% or less

1. Revenue estimates supplied by Input and International Data Corp. In many cases these estimates vary with the vendors' actual revenues.

Not included in this chart are Electronic Data Systems Corp. (EDS), Reynolds and Reynolds, Co. and Shared Medical Systems, whose respective revenues are estimated to be $313 million, $113 million and $83 million. EDS and Shared Medical Systems operate more on a facilities management basis than on a strictly processing services basis. Reynolds and Reynolds processing services revenues were about $47 million of its total revenue last year, with the remainder derived from turnkey systems and terminals manufactured by the company.

2. Revenue from services sold outside of the bank through various subsidiaries.

Processing service firms have been selling hardware since 1977, when Xerox Computer Services made available an intelligent terminal system for use as an in-house system and as an adjunct to remote computing services. Since then many processing firms have added minis to their product lines.

Although still considered a hot topic in the industry, selling turnkey minicomputers has not met with overwhelming acceptance among processing firms because they are generally not very profitable.

"Turnkeys have been unsuccessful because they usually offer plain vanilla general ledger packages," maintained Warren N. Sargent Jr., director of information processing services programs for Input, a Palo Alto, Calif.-based research firm.

International Data Corp. (IDC) estimated that by 1984 only 4% of processing service revenues will come from hardware sales, up from the 3% in 1979, which represented less than $200 million in sales.

Faring much better are those vendors selling highly specialized turnkey mini systems such as McDonnell Douglas Automation Co.'s computer-aided design system.

Data Base Services

In addition to increasing emphasis on hardware and software sales, processing service vendors see a great opportunity selling data base services. Several of the top 10 vendors in the industry, such as Automatic Data Processing, Inc., have already entered the data base services arena (see accompanying chart).

IDC estimated the market for remote data base services will reach annual sales of $1.6 billion by 1984, up from $572 million in revenues last year.

Interestingly, the ability to obtain the technology to deliver data base services has been the driving force behind some of the more spectacular acquisitions in the industry. Good examples of these are Dun & Bradstreet, Inc.'s $167 million purchase of National CSS and McGraw Hill, Inc.'s $103 million acquisition of Data Resources, Inc., Broadview's Goldstein pointed out.

And mergers and acquisitions in the processing services segment will continue strong. IDC calculated processing firms acquired 33 software or processing services firms last year. This trend is in keeping with these firm's desire to provide a wider range of services to selected markets.

In addition to expanding application packages, some vendors are creating application development tools, like Nomad or Ramis, offered to end users on a time-sharing basis, according to Burt Grad, president of Burton Grad Associates, Inc., a consulting firm for computer services companies.

At the same time as processing service firms are trying to find ways to expand their offerings, Input's Sargent noted nonprocessing firms are edging into the business. Airlines are offering services to other airlines, General Motors Corp. is providing services to dealers, and banks are marketing services to other banks.

While Sargent is not alarmed at this trend, he certainly views it as a red flag for established processing service companies.

Terminals NOW!®
3 Month Lease or Immediate Sale

PERKIN-ELMER
551
1100
1200
1251

VT-100
VT-52
DEC
LA-34
LA-36
LA-120

DIABLO
630
1640/50

LEAR SIEGLER, INC.
ADM–3A+
ADM–31
ADM–42

TTY
TTY-43
TTY-43ASR

TI
TI-745
TI-765
TI-820

RACAL-VADIC
All Models

QWIKTERM®
Your single source for brand-name terminals.

BOSTON (617) 246-1665
P.O. Box 185 Lynnfield, MA 01940
CHICAGO (312) 595-7733
284 West Devon Ave., Bensenville, IL 60106
SAN FRANCISCO (415) 461-0923
1100 Larkspur Landing Cir., Larkspur, CA 94939
WASHINGTON, D.C. (703) 522-1210
1555 Wilson Blvd., Arlington, VA 22209

TOP 10 AT A GLANCE

COMPANY	MAJOR SERVICES	NEW DIRECTIONS
CONTROL DATA CORP.	The Data Services Co. within CDC includes the Service Bureau Co. as well as CDC's specialized Arbitron, Ticketron and Cybernet services. The Service Bureau Co. contributes some 90% of Data Services revenue and has two major offerings. One is time-sharing services with more than 2,000 applications, primarily commercial. The other is DP services, mainly for banking, credit unions, brokerage, electronic funds transfer and delinquent accounts collection. CDC's Cybernet services are used for scientific applications.	CDC is placing more emphasis on data base services, such as the Evans Economic Data Base. New data base services will concentrate on current industries served, including manufacturing, insurance and banking. Moreover, the firm is selling a turnkey mini for the wholesale/distribution industry and is also expanding its electronic trading service which allows securities brokers to execute sales directly from their offices via a terminal. Currently 75 issues listed on the Cincinnati Stock Exchange are traded this way.
AUTOMATIC DATA PROCESSING, INC.	ADP consists of two major groups: the Commercial Services Group, which handles accounts payable, accounts receivable, general ledger and unemployment cost control processing services across major industries; and the Financial Services Group, which performs bank DP services such as deposit accounting and brokerage processing. In addition, the company has three divisions: The Network Services Division encompasses its Onsite program, which places mini systems at the customer's site to operate in a dedicated function or interact with central ADP systems; the Dealer Services Division provides inventory control and other applications for automobile, equipment and other dealers; a third division offers pension services applications.	ADP reports it will concentrate on "more of the same" for the next five years, since all current business areas look healthy. It recently added a Collision Estimating Division, which will offer insurance companies a computerized look at the cost of repairing automobiles involved in accidents. The firm also intends to move more heavily into the area of proprietary data bases, providing specialized applications based on data gathered from publicly available sources. A step in this direction was the recent formation of Econolyst, an equally owned joint venture with the consulting firm of Townsend/-Greenspan.
GE INFORMATION SERVICES	Through its Mark III time-sharing service, GEIS offers financial management, forecasting and general business processing services across a broad spectrum of industries.	GEIS over the past year has developed applications for the energy and retail store sectors. Enercom is a residential energy audit service and Epos is an electronic purchase order service.
TYMSHARE, INC.	Tymshare offers internal accounting services for banks, is a major processor of income taxes through the acquisition of Dynatax and is heavily involved in credit card processing. The company also offers a service called Manufacts for smaller manufacturing companies in the $5 million to $25 million revenue range consisting of on-line accounting and manufacturing control applications. Through Tymcare, the firm provides financial and patient tracking services for hospitals on the East Coast. Tymshare provides a variety of services for accounting firms of all sizes. In addition, the company operates its data communications network, Tymnet, which last year provided $16 million in revenue.	Tymshare intends to continue adding services in the area of check guarantee, credit card processing and health care. To this end the firm, within the past year, has acquired Telecheck Services, Inc., Medistat, Inc. and Bankcard Association of Rhode Island. Currently the company is testing in California a check guarantee service using a T-3 digital authorization telephone and plans to expand this service to other parts of the country. Through the acquisition of the Rhode Island company, Tymshare intends to obtain a foothold for credit card processing services on the East Coast. Tymnet is the fastest growing unit of Tymshare, revenues expanding at 50% annually compared with 30% for Tymshare as a whole. The company recently acquired Microband Corp. of America, a maker of microwave transmission products, to further the expansion of the Tymnet service.
UNITED INFORMATION SYSTEMS, INC.	The company currently has four primary areas of specialization. Its project management services, called Oscar, are provided by its On-Line Systems unit and account for about one-third of the company's processing services revenue. Applications for the telephone and engineering sectors contribute about 20% each to processing services revenues. Fourth, United Information Systems provides services for government, under both General Services Administration contracts and sole source contracts to individual government agencies.	The firm's future plans call for expanding applications to its current market sectors. In particular, it is beginning to offer specialized on-site hardware with graphics capability for design analysis and documentation and specifications drawing for structural, electronics and petrochemical engineers. For the telephone industry, the firm is offering management information services such as business planning and financial modeling using interactive graphics.
McDONNELL DOUGLAS AUTOMATION CO.	McAuto's Health Care Services Division provides financial and patient care applications to doctors' offices and 532 hospitals, representing 48% of McAuto's 1980 processing service revenues. Another major service area is for structural, civil and mechanical engineers, including structural design and analysis for bridges, high-rise buildings, dome stadiums and so on. The communications industry, primarily telephone companies, is a third prominent application area. For these companies McAuto offers on-line IMS services; Force, an operator scheduling application; and Dens, a directory equipment numbering system.	McAuto is expanding sales of its computer automated design and manufacturing (CAD/CAM) turnkey systems. This year services and hardware sales in the CAD/CAM area represented 7% of revenues and is slated to double next year. McAuto is also stressing graphics interfaces for its engineering applications, but intends to expand these to business services offerings. While remote processing will continue to be a major thrust of McAuto, the company also plans to sell software packages built around IMS, professional services and equipment leasing of minis as front ends for the company's processing services.
COMPUTER SCIENCES CORP.	Through its Infonet time-sharing network, CSC offers general business applications for the federal government and Fortune 1000 companies. These services represented about 80% of CSC's processing services revenues last year. Besides services through Infonet, CSC provides payroll, accounts receivable and payable and general ledger applications for small businesses; on-line financial management and inventory management for distributors and manufacturers; and third-party claims processing services for health insurers and labor unions.	Through the acquisition of three Itel Corp. processing services units last year, CSC intends to emphasize general business services to small and medium-sized businesses in the $5 million to $25 million range. "Small businesses need services, not hardware," a spokesman noted. The firm also plans to step up its third-party health care processing services. Recently it added processing of vision and hearing aid claims for labor unions, Blue Cross and Blue Shield and other health plans.
NCR CORP.	Through its NCR Data Centers Division, NCR provides various services to the financial and retail sectors, markets that match the company's important mainframe targets. For the financial sector, NCR provides accounting processing, NOW account processing and automated teller machine network switching for commercial banks and thrift institutions. For its retail customers, NCR provides accounting services, management control reports, unit control modules and cash planning for apparel stores, leisure time stores and specialty stores.	NCR will continue to concentrate on the financial and retail sectors. In particular; it is interested in providing more services for commercial banks, whereas in the past it concentrated heavily on thrift institutions. NOW account processing and automated teller machine network switching offer the company growing opportunities. In the retail sector, NCR is increasingly offering on-line inquiry services for timely reporting. With tight cash requirements today, retail vendors are no longer satisfied obtaining reports through the mail that are two weeks old, a spokesman noted. NCR does not plan on providing its clients turnkey minis.
BRADFORD NATIONAL CORP.	Bradford specializes in services-related stock transfers and bank trust accounting. Bradford also provides securities custody services, portfolio and employee benefit recordkeeping, personal trust accounting and annuitant services. The company offers on-line real-time bank trust accounting services to 75 of the largest banks in the country. Moreover, the company does processing for the New York state Medicaid program.	Bradford will continue to offer a wider range of services related to its current niches. For example it is now offering on-line trust accounting services for small to medium-sized banks and recently established Bradford Broker Settlement, Inc., a clearing service in 30 cities for the equities market. Bradford also intends to expand its services in the health care and insurance industries. To this end, the firm recently purchased Eagles National Corp. and its wholly owned subsidiary, Eagles National Life Insurance Co.
NATIONAL CSS, INC.	National CSS specializes in DP development tools and offers an end-user data base management system, Nomad, which is currently the most prominent sector of the firm's business. Other applications include engineering design, business research, demographics and econometrics. Moreover, the company offers a hardware system, the 3200, that can incorporate all of the firm's application programs, tools and data base management system. Last June the company merged its computer division and remote computer services division into one entity named Integrated Systems and Services.	National CSS is emphasizing its Nomad product. It recently introduced Nomad II, which offers four new functions: full CRT screen support, multiple concurrent users, arithmetic and statistical functions and arrays, including time series. This data base product is sold to middle management end users across most industries. The company plans to introduce a human resources package next February and will introduce a Nomad-like product targeted at middle managers. In the near future, National CSS will introduce specialized tools for the banking, insurance and electronic manufacturing industries.

CW Chart (Information Supplied by Vendors)

Industry Spotlight

To Hit $8.6 Billion

Processing Services Expected to Grow 17%/Year

By Marcia Blumenthal
CW Staff

Processing services will account for $8.6 billion or 62% of total 1980 service industry revenue of $14 billion, according to projections made by Input, a Palo Alto, Calif-based research firm.

Although Input noted processing services in the future will hold a smaller portion of the total industry revenues than it has in the past, this segment of the services industry is expected to grow at a healthy 17% per year within the next five years, with certain segments growing even faster. Remote computing services, for example, will post a 22% annual growth rate this year, Input said.

While the phenomenal 30% annual growth of the software segment of the industry has eclipsed the processing services sector, observers agree processing services are not in danger of fading into oblivion. Professional services is the third sector of the services industry and will grow about 16% yearly, Input said.

Health Assured

The health of processing services is assured by users' continued inability either to provide all applications in-house or provide the computing power necessary to perform all applications.

Not surprisingly then, even corporations with extensive in-house computing capability comprise a large portion of the remote computing service customer base, Datapro Research Corp. noted.

Some 58% of users of service firms polled in a recent Datapro survey said they had an extensive in-house computing facility, while another 22% of the total responded that they had "some in-house capability."

The revenue size of companies represented in that survey was at least $100 million for 59% of the users responding.

Monthly Bills

The Datapro survey detected no trend in users' total monthly bill for remote computing services, which ranged from $500 to $10,000.

However, the research firm did find 57% of the users were spending less than $500 per month for terminal costs. This appeared to be consistent with the Datapro finding that 58% of the users had three or less terminals in-house.

Regardless of the extent to which computing services are utilized, market research firm International Data Corp. (IDC) noted that the segmentation of the market is changing.

In 1979, 40% of the processing services revenue was derived from traditional batch services, but by 1984, batch services will contribute only 25% of that revenue.

This shows an increasing commitment of these companies to data communications, IDC noted.

By 1984, 75% of processing services revenue will be contributed by some sort of data communications instrument, IDC predicted.

As for applications functions, IDC forecast data base inquiry would be the fastest growing applications, increasing from a 1979 revenue base of $75 million to $1.4 to $1.6 billion yearly by 1984.

Although the processing services market continues to be highly fragmented, the trend toward consolidation is increasingly visible. In 1978, the companies with more than $50 million in annual revenue held a 42% share of the market, but in 1979 that share had jumped to 50%, IDC said.

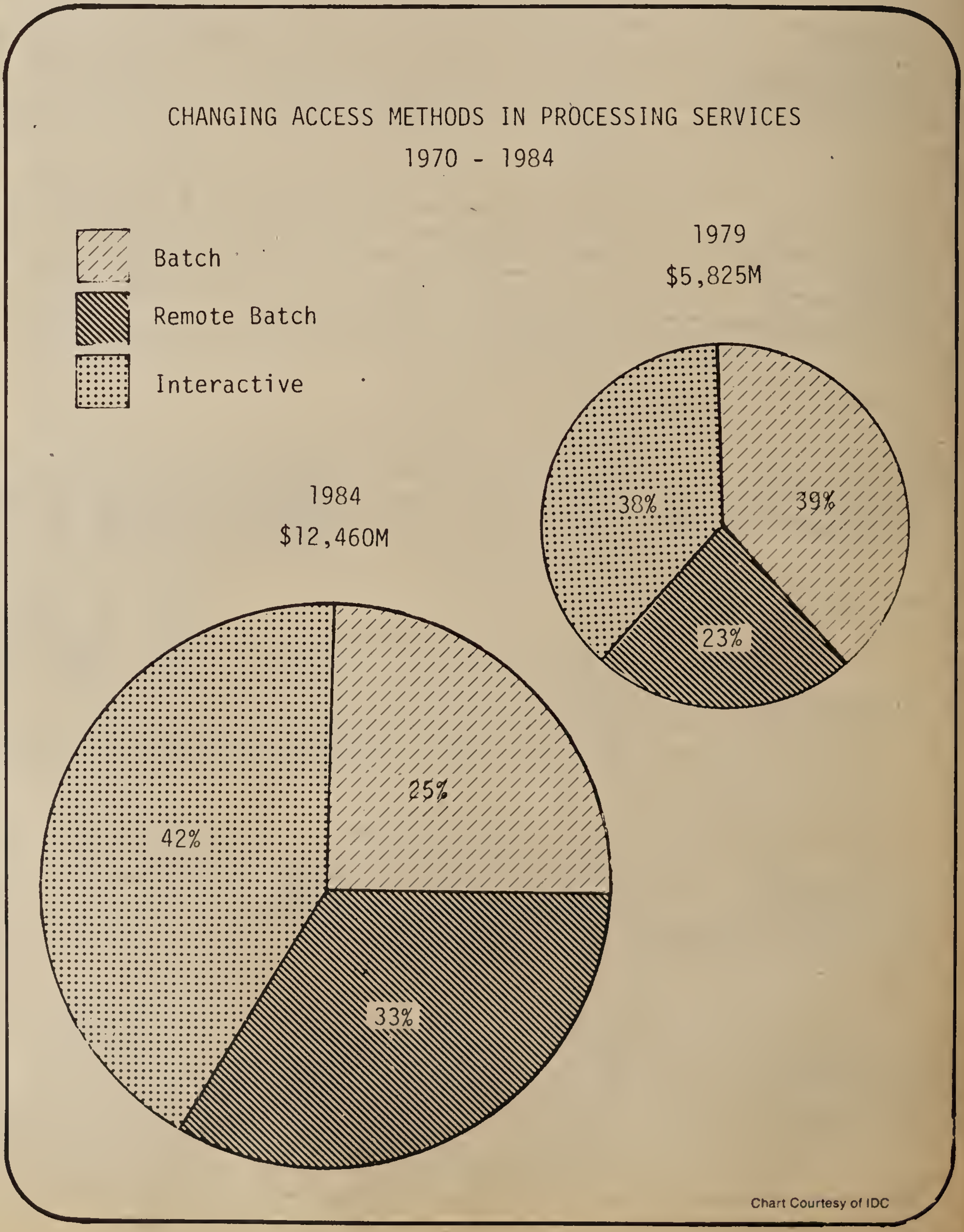


Chart Courtesy of IDC

DEC
PDT 1-Day Ship!
11/150
64KB CPU, 512KB Storage, VT100, (4) I/O Ports, WP, DBMS or Project Management Software
IN STOCK 11/60, 11/55, 11/45, 11/40, 11/34, 11/20, 11/15, 11/10, 11/05
CALL (617)437-1100
AMERICAN COMPUTER GROUP, INC.
P.O.BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215

PHOENIX LEASING'S
OPERATING LEASE PROGRAMS FOR HIGH TECHNOLOGY COMPANIES

- Phoenix Leasing Incorporated specializes in the design and implementation of lease programs based upon your marketing and leasing ideas. Whether your lease terms are as short as one year or as long as five years, we can accommodate your needs.
- If you would like to generate significantly greater cash flow from your operating leases and be able to record them as sales, we can help.
- Phoenix Leasing's experts can respond to your needs with both creativity and flexibility. Take advantage of the profits and cash available to your firm through our operating lease programs.

Call Gary Martinez now at (415) 383-9700.

PHOENIX
LEASING
INCORPORATED
495 MILLER AVENUE, MILL VALLEY, CA 94941

Supervisor Job Called Toughest in World

By Rita Shoor
CW Staff

CHICAGO — First-level information management supervisors have the "toughest job in the world," according to Nate Newkirk, a speaker at the recent Spectrum /80 conference sponsored here by Advanced Systems, Inc. (ASI).

One way for these hard-pressed project leaders to improve their lot is to decrease the amount of time spent in fire-fighting activities while increasing the focus on leadership qualities. During a session entitled "Delegating for Improved Productivity," the consultant from Newkirk Associates, Inc. maintained that the ideal time model for a first-level supervisor is to spend 30% of available time on a combination of planning, organization and control functions. The remaining 70% of the time should be allocated to leadership, he said.

Leadership was defined as "getting things done through others," he said. "People don't write wrong programs, they're just being told to do the wrong things" by their bosses, according to Newkirk.

Nine-Step Procedure

He then outlined a nine-step procedure for assigning someone a task, which he maintained would improve a worker's on-the-job performance. This improvement should, in turn, imply a corresponding increase in that worker's productivity, Newkirk claimed.

First, the project leader must actually assign the task to be accomplished. This is usually done by describing the desired end result. "Design a human resources system," for example, would qualify as a complex task assignment.

The next step is to discuss the constraints tied to the assigned task. These might include such items as the due date and the number of people available for the job, he said.

The project manager must then inform his subordinate of the criteria that will be used to judge the final result. Evaluation criteria could include the cost or effort to complete the project, timeliness of the project's completion and the quality of the end product.

The quality might be judged by how well the system or program meets the requirements originally specified by the end user. Ease of maintenance and program enhancement — both of which are heavily dependent on documentation — could also be used to evaluate the product, he said.

Fourth, the supervisor must get some feedback on the assignment from his subordinate. It is essential to treat people differently according to their professed and/or documented performance, he said.

Newkirk suggested that one of the best ways to obtain this feedback is to ask the assignee to come up with a plan that outlines the sequential steps to be taken to solve the problem. This process allows the manager to find out "up-front" whether the programmer or analyst understands the job's requirements. He emphasized that this plan would list *what* had to be done without going into detail as to *how* the job would be accomplished.

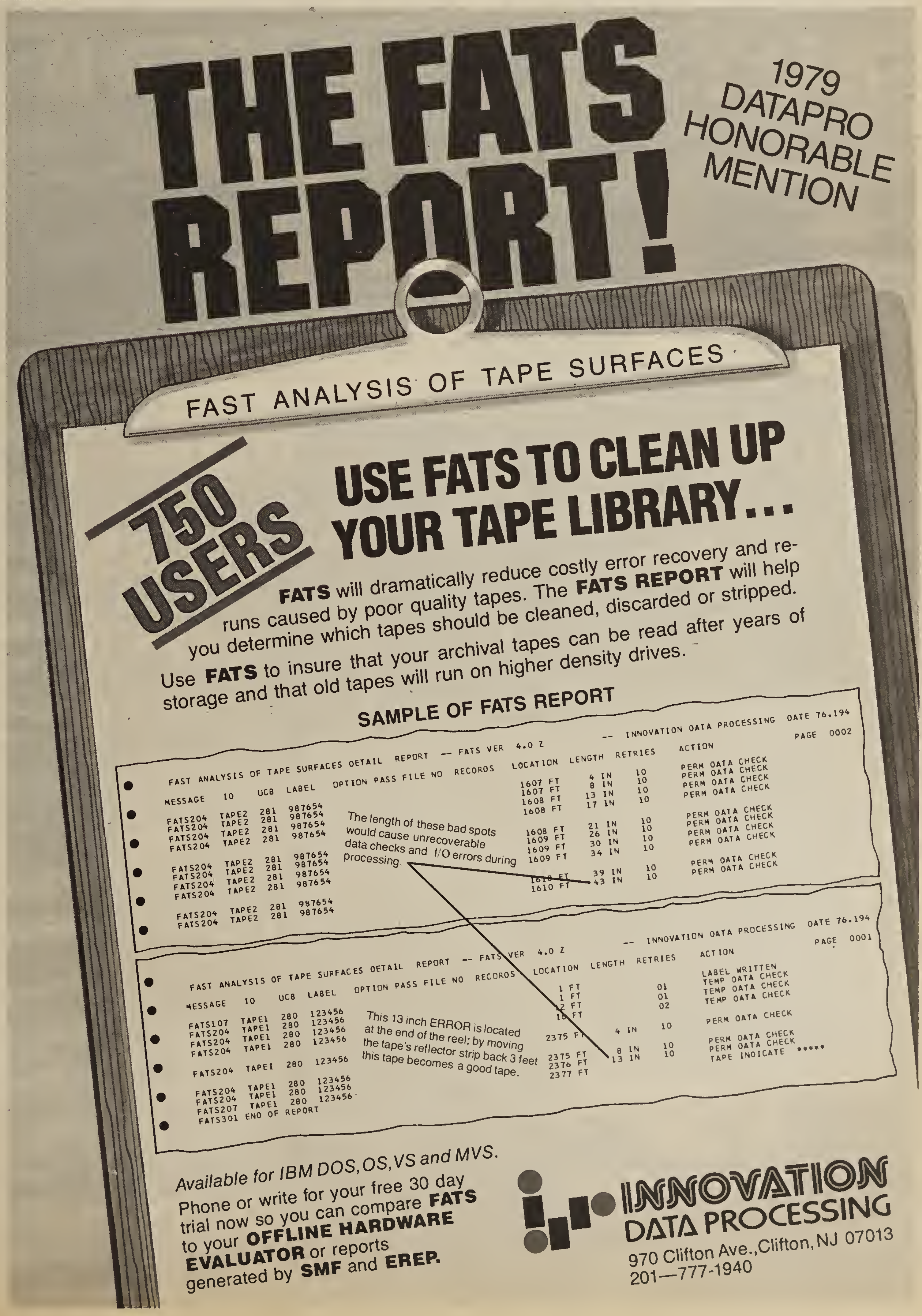
Next, the supervisor and subordinate work together to set up a schedule of interim deadlines. "Each one of [the deadlines] should have the same characteristic as the end goal — in that a deliverable is received," he said.

Newkirk noted that the control schedule can be negotiated and used as a reward/punishment tool by the manager. The person who consistently meets the interim deadlines can be rewarded by the fact that the manager is not constantly checking on him. The opposite naturally applies to the technician who is missing the deadlines, he said.

The sixth step is to "strip away all excuses for failure" by asking the question: "What help do you need?" By actually providing this help, which is seventh on Newkirk's list, the manager puts the technician in a position where he cannot point to outside factors if the project is not successfully completed.

Documentation of all items under discussion as the project goes along is the manager's responsibility. If, for example, deadline pressures force the manager to tell the programmer to "forget about documentation for now," he must put this in writing and inform the technician that the quality of documentation is no longer among the final criteria by which he will be judged.

The ninth and last item required for successful delegation is formal and informal evaluation, according to Newkirk. Informal evaluations should be performed at each of the interim deadlines, while a formal evaluation is necessary once the project has been completed.


THE FATS REPORT!

1979 DATAPRO HONORABLE MENTION

FAST ANALYSIS OF TAPE SURFACES

750 USERS

USE FATS TO CLEAN UP YOUR TAPE LIBRARY...

FATS will dramatically reduce costly error recovery and reruns caused by poor quality tapes. The **FATS REPORT** will help you determine which tapes should be cleaned, discarded or stripped.

Use **FATS** to insure that your archival tapes can be read after years of storage and that old tapes will run on higher density drives.

SAMPLE OF FATS REPORT

```
                                                           -- INNOVATION DATA PROCESSING   DATE 76.194
FAST ANALYSIS OF TAPE SURFACES DETAIL  REPORT  -- FATS VER  4.0 Z                                PAGE  0002
MESSAGE   ID    UCB  LABEL   OPTION PASS FILE NO  RECORDS   LOCATION  LENGTH  RETRIES   ACTION
FATS204  TAPE2  281  987654                                 1607 FT    4 IN     10     PERM DATA CHECK
FATS204  TAPE2  281  987654                                 1607 FT    8 IN     10     PERM DATA CHECK
FATS204  TAPE2  281  987654                                 1608 FT   13 IN     10     PERM DATA CHECK
FATS204  TAPE2  281  987654                                 1608 FT   17 IN     10     PERM DATA CHECK

FATS204  TAPE2  281  987654                                 1608 FT   21 IN     10     PERM DATA CHECK
FATS204  TAPE2  281  987654                                 1609 FT   26 IN     10     PERM DATA CHECK
FATS204  TAPE2  281  987654                                 1609 FT   30 IN     10     PERM DATA CHECK
FATS204  TAPE2  281  987654                                 1609 FT   34 IN     10     PERM DATA CHECK

FATS204  TAPE2  281  987654                                 1610 FT   39 IN     10     PERM DATA CHECK
FATS204  TAPE2  281  987654                                 1610 FT   43 IN     10     PERM DATA CHECK
```

The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.

```
                                                           -- INNOVATION DATA PROCESSING   DATE 76.194
FAST ANALYSIS OF TAPE SURFACES DETAIL  REPORT  -- FATS VER  4.0 Z                                PAGE  0001
MESSAGE   ID    UCB  LABEL   OPTION PASS FILE NO  RECORDS   LOCATION  LENGTH  RETRIES   ACTION
                                                                                        LABEL WRITTEN
FATS107  TAPE1  280  123456                                    1 FT             01     TEMP DATA CHECK
FATS204  TAPE1  280  123456                                    1 FT             01     TEMP DATA CHECK
FATS204  TAPE1  280  123456                                   12 FT             02     TEMP DATA CHECK
FATS204  TAPE1  280  123456                                   16 FT

FATS204  TAPE1  280  123456                                 2375 FT    4 IN     10     PERM DATA CHECK

FATS204  TAPE1  280  123456                                 2375 FT    8 IN     10     PERM DATA CHECK
FATS204  TAPE1  280  123456                                 2376 FT   13 IN     10     PERM DATA CHECK
FATS207  TAPE1  280  123456                                 2377 FT                    TAPE INDICATE  *****
FATS301  END OF REPORT
```

This 13 inch ERROR is located at the end of the reel; by moving the tape's reflector strip back 3 feet this tape becomes a good tape.

Available for IBM DOS, OS, VS and MVS.

Phone or write for your free 30 day trial now so you can compare **FATS** to your **OFFLINE HARDWARE EVALUATOR** or reports generated by **SMF** and **EREP.**

INNOVATION DATA PROCESSING
970 Clifton Ave., Clifton, NJ 07013
201—777-1940

LEAR ADM-42 USED $595
LEAR ADM-31 USED $595

— IMMEDIATE DELIVERY —
— 30 DAY WARRANTY —

USED LA-120	$1495
USED ADM-3A	$ 525
USED DIABLO 1620	$1795
USED VT-52	$1095

TBC
TERMINAL BROKERS COMPANY
Box 312 • 37 Franklin Street
Needham, MA 02192
Call (617) 449-0216
Some Items Limited Quantity

Communications Tops Europeans' Lists

DELRAN, N.J. — Expanding data communications capabilities and additional software top users' lists of purchases in West Germany, France and the UK.

That is what users polled in the Datapro Research Corp. "European User Rating of Computer Systems" report indicated when asked about upcoming planned acquisitions.

Two other high-growth areas will be in distributed processing and integrated word processing, according to the users surveyed.

WP Applications

Although word processing (WP) has not been implemented in most European sites yet, users in all three countries listed it as one of the top 10 applications for the year.

In both West Germany and the UK, users told Datapro their major problem was with systems proposed by the vendors being too small for their needs. The major problem among the French was late delivery and/or installation of equipment. Too small systems ranked as the No. 2 problem in France.

Other major problems cited by the European users were the difficulties in keeping up-to-date on vendor enhancements and changes in hardware and software, excessive power and cooling requirements and system costs exceeding the expected total.

Major Benefits

Major benefits from their systems, according to the users surveyed, included efficient response time, compatible programs and data, as promised by the vendor, and easy expansion and reconfiguration of the system.

Accounting, payroll and personnel and manufacturing were the major applications used by the respondents, with transaction processing rising rapidly in use. Cobol was the most popular language used, with assembler running a strong second.

Users were found to be looking increasingly toward outside sources for software as a means of containing costs.

"Ready-made" packages from the manufacturers and proprietary packages are the two most popular outside sources for mainframe users, with French and British users favoring proprietary packages and German users preferring "ready-made" packages from the vendor, the survey showed.

The methods of purchasing a computer varied, depending on a vendor's pricing policies in each country. In Germany and the UK, users preferred purchasing systems, but in France, users showed a distinct preference for renting, the survey found.

Survey Covers 3,485 Users

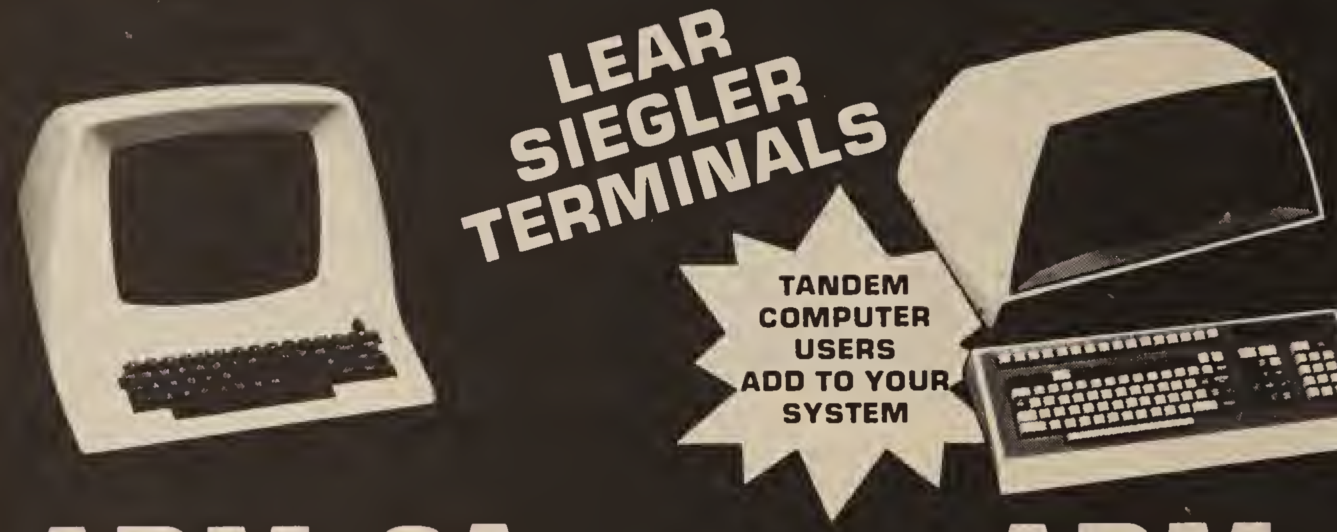
DELRAN, N.J. — Datapro's "European User Ratings of Computer Systems" represents information obtained from 3,485 users of mainframes, minicomputers and microcomputers.

The survey was conducted with the help of France's *Zero-un Informatique*, West Germany's *Computerwoche* and the UK's *Computer Weekly* and is considered one of the most comprehensive examinations of the European computer industry ever undertaken.

Users were asked 87 questions in 14 categories with the intention of determining how they rate their computer systems.

Survey results and analysis are available for $25 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

BUY OF THE YEAR



ADM-3A
UPPER CASE — DUMB — VERY DUMB®
USED
$525

ADM-2
LOW COST — SMART
USED
$795

★ 30 DAY WARRANTY
★ IMMEDIATE DELIVERY
★ FULLY RECONDITIONED

ADM-31 USED $595.00
ADM-42 USED $595.00

AND MUCH - MUCH - MORE

NEW NEW	
DIABLO 1650 w/Platen & Wheel	$2450
DIABLO 1640 w/Platen & Wheel	2350
AUSTRALIAN TI-745	1395
DEC VT-52	1495
TECHTRAN 8421 dual tapes w/editing	1295
ADM-3A New	850
TTY 43 (Friction — TTL)	895
DEC LA-36	1595
TECHTRAN 8400	1295
VT100	1595
LA 120	2395

USED USED	
DEC LA36	$ 995
DEC LA-120	1495
DEC LS-120	1295
DTC (DIABLO PRINTER) 300	895
TI-765	1795
TECHTRAN 815	495
COM DATA COUPLERS	100
VENTEL COUPLERS	100
TI-745 APL	1295
TELETYPE 43 (Friction — TTL)	695
BEEHIVE B-100 CRT	295
TECHTRAN 8400	695
DIABLO 1620 w/PLATEN & WHEEL	1795
TI 733 ASR	1400
VT-52 CRT	1095

TBC
TERMINAL BROKERS COMPANY
37 FRANKLIN STREET
BOX 312
NEEDHAM HTS., MA 02194

CALL FOR INFORMATION
(617) 449-0216

Some Items Limited Quantity
® Registered Trademark of Lear Siegler

Casa/SME Offers Award For CIM Work

DEARBORN, Mich. — "Lead" is the acronym for "Leadership and Excellence in the Application and Development" of computer-integrated manufacturing (CIM) — and the name of an industrywide annual award recently established by the Computer and Automated Systems Association (Casa) of the Society of Manufacturing Engineers (SME).

The first Lead Award will be presented in 1981 to the company technical management team that has incorporated an innovative CIM program into its operations.

Specifically, Casa/SME said, the team will have demonstrated leadership by achieving a CIM team approach composed of professionals from several disciplines, installed applications that link and integrate multiple manufacturing functions, management vision and commitment to improved productivity by CIM on a near- and long-range basis and dissemination of their valuable "how to" experience to advance CIM methodology in the industry.

In this way, the Lead Award hopes to emphasize the need for implementing CIM programs and sharing information, Casa/SME said.

The procedure for nominating a company team for the 1981 award is available from Casa/SME Headquarters, 1 SME Drive, P.O. Box 930, Dearborn, Mich. 48128.

Few Plan System Replacements

User Satisfaction Found Common In Europe

By Ann Dooley
CW Staff

DELRAN, N.J. — What do computer users in France, West Germany and the UK have in common?

They are all so satisfied with their systems — regardless of manufacturer — that they have few system replacement plans and, in general, would recommend their own system to other users.

A comprehensive examination of the computer field in France, the UK and West Germany by Datapro Research Corp., "European User Rating of Computer Systems," futher revealed that no one mainframe vendor is distinguishing itself by performing either a particularly good or bad job of pleasing users.

Except the Amdahl Corp., whose equipment received a 100% recommendation for use by its users and a perfect overall equipment rating by French users — the only group to rate Amdahl equipment — the statistical difference between user satisfaction was no more than a .6 spread.

Digital Equipment Corp., which rated second highest in user satisfaction by users in all three countries, was also given a 100% recommendation by French and German users, but would be recommended, interestingly enough, by only half the British DEC user population.

French users rated Amdahl, DEC and National Advanced Systems (Itel) among the top three vendors. German users gave CII Honeywell Bull, NCR Corp. and IBM the top three positions, and Honeywell, Inc., DEC and IBM made the top spots in the UK.

Overall Satisfaction

Users in the three countries generally rated their systems as "good" in terms of overall satisfaction. On a scale of one (poor) to four (excellent), vendors as a whole were given a 2.8 rating in France, a 2.8 rating in Germany and a 2.9 in the UK, compared with 3.1 in the U.S., according to previously compiled Datapro figures.

Their level of satisfaction was also apparent in the fact that more than three-quarters of those polled would recommend their present systems to other users.

German users were most pleased, with 80% responding they would recommend their systems; 78% of British users would offer recommendations; and 74% of the French users would recommend their present systems, the survey found.

The entire survey covered 5,000 systems at 3,485 user sites and showed that more than two-thirds of the users have no system replacement plans. Of those planning new systems, the Germans indicated the most loyalty to their current mainframe/plug-compatible vendor, where only 2% expect to switch vendors. British users were shown most willing to change allegiances, with 10% reporting plans to change vendors.

European users are generally less satisfied with their systems than U.S. users, with Germans the least satisfied, according to Datapro statistics. The greatest area of dissatisfaction in all three countries is in technical support, where users almost unanimously gave vendors low ratings, usually pinpointing "troubleshooting" as a source of special dissatisfaction.

	OVERALL USER SATISFACTION			WOULD RECOMMEND TO OTHERS (%)					
	UK	France	Germany	UK		France		Germany	
				Yes	No	Yes	No	Yes	No
Amdahl	*	4.0	*	*	*	100	0	*	*
Burroughs	2.8	2.9	2.4	73	24	76	17	56	44
CII Honeywell Bull	*	2.7	3.0	*	*	66	29	80	11
CDC	*	*	2.7	*	*	*	*	67	33
DEC	3.0	3.3	2.8	50	50	100	0	100	0
Honeywell	3.2	*	*	97	3	*	*	*	*
IBM	3.0	2.9	2.8	88	9	77	18	78	18
ICL	2.9	2.7	*	65	29	56	38	*	*
NAS (Itel)	*	3.2	2.6	*	*	100	0	83	17
NCR	2.8	2.6	2.9	74	26	64	36	87	9
Siemens	*	2.9	2.8	*	*	77	15	84	15
Univac	2.9	2.9	2.8	75	25	78	17	83	14

Figures above are weighted averages based on a scale of 1 (poor) to 4 (excellent).

* — Not Applicable

Results of Datapro's 'European User Rating of Computer Systems'

User Findings

Here are some significant user findings for each country on a vendor-by-vendor basis:

- **Amdahl Corp.** received a 100% recommendation for its 470 system by French users. This system received the highest rating in the survey, scoring a perfect 4.0 overall satisfaction rating and generally receiving high ratings for each of its individual system components. Only its education and documentation received anything but good to excellent marks, but systems across the board scored low in this category.
- **Burroughs Corp.** achieved a 100% recommendation for two of its systems in the three countries, among them the B2800 in France and the B3700 in the UK.

While all of Burroughs' systems scored generally well by European users, French DPers gave disapproving marks to the B4700 and B4800 systems, granting those two only a 25% recommendation rate. Burroughs scored lowest in Germany in terms of overall satisfaction, but German users gave the B1700 and B1800 operating systems perfect 4.0 overall ratings. The British gave the B1800 high marks for its ease of operation and its operating system and the B2700 and B3700 high ratings for their compilers and assemblers and mainframes reliability, respectively. The French commended the B3700 for its operating ease and the B3800 for its operating system and compilers and assemblers.

- **CII Honeywell Bull** drew a mixed reaction from users in Germany and France. Its Level 64 achieved a 91% user recommendation while models (excluding the Level 66) achieved only a 33% recommendation from users. In France, the Level 66 obtained a 100% recommendation, but the French gave the Iris 80 only a 14% recommendation and the Series 77 received absolutely no recommendations by users — the only case where this happened in the survey.
- **Control Data Corp.** received tempered approval from the Germans. Two-thirds of the users said they would recommend CDC systems to others, but no outstanding rates were given to any of the specific system components.
- **Digital Equipment Corp.'s** Decsystem 20 obtained a 100% recommendation for both French and German users, while only half the British said they would recommend the Decsystem 10 even though they gave it a "good" overall satisfaction rating.
- **Honeywell Inc.'s** Level 64 and Level 66 received 100% recommendations from its user group and received a 3.2 overall satisfaction rating. The British appear to be more satisfied with the equipment than U.S. users, who

(Continued on Page 16)

HP 3000
HARDWARE AND SOFTWARE

- **HP HARDWARE AND SYSTEM SOFTWARE** installed and fully supported by Hewlett-Packard.
- **SUCCESS-PROVEN APPLICATION PACKAGES** installed and fully supported by their developers, Hewlett-Packard and Data Systems for Industry.
- **FIXED PRICE AND SCHEDULE** with hardware-software discounts and leasing available to qualified customers
- **INTERNATIONAL SUPPORT FROM OFFICES IN—**

Los Angeles New Jersey Dallas Europe

ACCOUNTING
- Payroll, Personnel
- Labor Distribution
- Accounts Receivable
- Accounts Payable
- Fixed Assets
- General Ledger

INTEGRATED MANUFACTURING
- Order Entry
- Material Requirements Planning (Materials Management/3000 or MFG/3000)
- Shop Floor & Capacity Control
- Job Cost Reporting

DISTRIBUTION
- Order Entry
- Multi-Warehousing
- Shipping
- Billing
- Replenishment Planning
- Distributed Processing

DISCOUNTS AND LEASING
- Up to 24% volume discounts on hardware-software systems sales
- Leasing available for hardware-software system sales

DATA SYSTEMS for INDUSTRY
3450 E. Spring Street, Long Beach, CA 90806
(213) 595-8741

Implementation Two Months Away

Congress Still Opposed to Nine-Digit Zip Code

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — There continues to be active congressional opposition to the U.S. Postal Service's (USPS) nine-digit Zip Code scheme even though scheduled implementation of the expanded codes is only two months away.

Although Postmaster General William Bolger recently rejected a heavily backed House resolution calling for delay of the new Zip Code until the plan can be further studied, a similar resolution has been put forward in the Senate.

In addition, a Senate Government Affairs subcommittee held hearings on the USPS plan with one committee member, David Durenberger (R-Minn.) threatening to seek a funding cutoff unless cost questions about the Zip Code plan were satisfactorily answered.

Lame Duck Session

With the lame duck session of Congress quickly nearing its end, it may be too late to stop the Zip Code expansion through the appropriations process, but the Postal Service has already demonstrated it will not be deterred merely by Congressional expressions of concern.

Bolger quickly turned aside the request of over 100 Congressmen for a delay raised in October correspondence between the Postal Service and Rep. Richardson Preyer (D-N.C.). The Postmaster General was also not moved by a House resolution that month that received strong bipartisan support and called for further cost-benefit studies of the Zip Code plan [CW, Oct. 20].

Fears Cited

Nevertheless, Sen. Roger Jepsen (R-Iowa), introduced the same resolution in the Senate Nov. 19.

Citing fears of massive computer reprogramming that might be necessitated by the new codes and the possible $1 billion cost for public conversion to them, Jepsen said he wanted to make sure the new Zip Code "will not place excessive costs and burdens on individuals and businesses."

Although Bolger said in October the USPS has "carefully studied the impact of our plan," and said the expansion would proceed on schedule, the USPS Board of Governors last month delayed appropriations for the equipment the Postal Service will need once the plan goes through.

Also further jeopardizing the scheduled February implementation schedule are problems USPS is reportedly having finding U.S. manufacturers to bid on the equipment procurement. Bolger has promised the necessary equipment, whose price tag may reach $1 billion, will be purchased from American vendors.

IBM's 3081 Said to Show Tendency To Control Pace of Evolutionary Process

By Rita Shoor
CW Staff

CHICAGO — IBM's recent announcement of the 3081 processor illustrated IBM's tendency to maintain a firm grip on the pace of evolutionary process and its commitment to change control, according to Michael Haupt, a senior product manager for Advance Systems, Inc. (ASI).

Speaking at ASI's Spectrum '80 conference here recently, Haupt predicted "rapid releases" of MVS system product (SP) versions, but added each phase in that evolutionary process will come one step at a time.

The former systems programmer also speculated that there might be a convergence of VM and MVS facilities in the future. Although this would not necessarily mean a merging of the two products, he indicated that the VM and MVS product development groups are "very aware" of what their opposite numbers are doing. IBM is very careful about its naming schemes, according to Haupt, and the vendor didn't call both VM and MVS "system products" by accident.

Haupt also predicted that a real technological upgrade will only come after the 3081's identical or "dyadic" processors are "out and tested." Then, IBM might increase the number of processors from two to four and possibly go to multiprocessing with the 3081, he said.

He does not foresee new hardware announcements coming out every two or three months, though. "IBM doesn't make a lot of the same mistakes twice," he noted, referring to the unhappiness generated among 370/155 users who were unable to run a VS operating system on their mainframes.

As far as the distribution function of ISM is concerned, Haupt indicated that announcements were supposedly imminent but warned the audience not to hold their breath while they waited for IBM to make things official.

Among the items that Haupt would like to see in these future announcements were:

- A faster link between the 3705 front-end processor and the CPU.
- Expansion of both the 3705 and the Network Control Program (NCP) to take advantage of outer intelligence devices that form a part of the network.
- Possible addition of power to the processor so that the teleprocessing access method can be run to the same box that runs NCP.

It might also be possible to run the network communication control facility (NCCF) base to the same piece of equipment. IBM currently advocates splitting the network control center from the system control center, he said.

Haupt predicted that there would be more network control operators than system console operators in computer rooms within five years.

Haupt also warned attendees about the vendor's MVS/SP Release 2, saying the software probably had some problems that were not "quite fixed" before the cutoff date for the development team. "Unless you're really into pain," he said, avoid bringing up Release 2.

Europeans Plan Few System Replacements

(Continued from Page 15)

rated Honeywell a low 2.9 overall satisfaction rating in an earlier Datapro survey [CW, May 19].

- **IBM**, although topping European manufacturers, did not stand out in user satisfaction, according to survey figures. IBM's 3032 and 3033 in the UK and its 370/168 and 3033 in Germany received 100% recommendations, and its other systems also did well in those countries. But IBM received only average ratings, for the most part, by French users with the exceptions of high marks to the 3032 for its maintenance response and to the 370/135, 370/138, 3033, 4331 and 4341 for mainframe reliability.

IBM scored well by British users on almost all of its models for its mainframe reliability and was given a perfect score for its mainframe reliability for the 370/148. In Germany, users gave the 370/115, 370/125, 370/138, 370/158 and 4331 high marks for mainframe reliability and 370/158 for responsive maintenance. IBM did score some low points on its older systems, a fact which may not be relevant since many of them are no longer even being manufactured.

- **International Computers Ltd.** (ICL) received only moderate recommendations for its systems other than its 2900 series in France and its 2960 system in the UK, which received 80% and 93% recommendations, respectively. Neither country gave ICL particularly outstanding ratings for any of its system components.
- **National Advanced Systems** received a 100% recommendation for its systems from the French, who gave it a 3.2 overall satisfaction rate, and 83% recommendation from the Germans, who gave it only a 2.5 overall satisfaction rating. The Germans thought well of its mainframe reliability and the French liked its ease of operation.
- **NCR Corp.**'s 8400 scored a 100% recommendation by the British and its 8400 and 8500 series received unanimous recommendations from the Germans. All three countries gave high marks to the 8400 series for its mainframe reliability and its ease of conversion. Its effective maintenance was cited by the British, who also commended the 8500 for its operating ease, its operating system and its ease of conversion.
- **Siemens AG**, Germany's own vendor, was given a 100% recommendation by German users for its 7531, 7740 and 7748. The Germans highly rated the 7531 for its responsive maintenance and the 7740 for its operating system. Both the Germans and French rated the 7700 high for its mainframe reliability.
- **Univac** varied among the countries in user recommendations. German users unanimously recommended the 90 series (other than the 90/30, which received more than three-quarters support).

French users gave 100% recommendations to the Univac 90/60 and 1106, while only one-third of the British would recommend the 90/60 or 90/70, while giving 100% recommendations to the 1100 series.

VSAM
USING ACCESS METHOD SERVICES (AMS)
December 15-19, 1980•9 AM to 5 PM

This course provides the information needed to allow the user to process VSAM files utilizing the AMS utility.

The course is intended for programmers destined to use the Virtual Storage Access Method during program development and maintenance.

Programmers with a basic knowledge of VSAM will be instructed in advanced VSAM techniques. The following topics will be examined in depth:
• VSAM Overview • VSAM Control Blocks • File Design
• VSAM Considerations within CICS • Optimizing VSAM
• Alternate index • Shared Resources • Recovery

Call COLLECT or write for complete information.
CompEd™
(212) 921-8676
1133 Ave of the Americas, New York, N.Y. 10036
A subsidiary of Spiridellis & Associates, Inc
Early registration recommended.
Courses based upon Monday-Friday schedule

yes, Please send more information & registration forms.
Name
Co. Name
Address
City State
Zip
V-121

IMS/CICS

Logplus makes IMS log tapes obsolete

Logplus

- **Finally tapeless IMS**
  Logplus writes the IMS log to a set of disk datasets and manages the continuous reuse of these datasets.
- **Cut restart time in half**
  Logplus automates all IMS restarts.
- **Trade your IMS tape drives for disks.**
  Many installations need only half of a 3350 pack.

Call or Write:

3270 Optimizer compresses messages

3270

Optimizer

- **Quicker response time**
- **Less line usage**
- **Up to 25% or more compression**
- **Transparent to IMS and CICS**
- **Over 150 installations around the world**

Related Products

- **3270 Line Utilization Monitor/IMS**
  Measures utilization of 3270 lines
- **3270 Line Response Monitor/IMS**
  Calculates communication response time of 3270 lines

BMC SOFTWARE

13401 SOUTHWEST FREEWAY SUITE 112 SUGAR LAND, TEXAS 77478 (713) 494-3116

At Training Conference

Drucker Stresses Personal Management

By Rita Shoor
CW Staff

CHICAGO — "One can't manage other people unless one first manages oneself." This pithy statement was the focal point of Dr. Peter Drucker's keynote speech at the recent Spectrum '80 here, the 12th annual training conference sponsored by Advanced Systems, Inc. (ASI).

Drucker made the presentation through the courtesy of high technology — "live via satellite" was periodically displayed at the bottom of the picture originating in California. In his remarks, the man sometimes described as the founding father of the discipline of management concerned himself with the personal aspects of organizational management rather than with the teleconferencing tools that enabled him to answer questions posed by Spectrum '80 participants.

Programmers, designers and systems analysts fall into that category of people defined by Drucker as "knowledge workers." In order to increase their productivity, the successful manager will play on their strengths rather than weaknesses. It is essential to place subordinates where they can perform to their highest achievement level, he said. "Of all the drugs we know, the most addictive one is achievement."

Worker Specialization Key

Another way to view this focus on workers' strengths is to take the example of someone who is technically competent — perhaps even brilliant — but does not communicate well with nontechnicians. He is probably not going to change this basic attitude. It is unlikely that this type of person is going to accept the need for increased communication skills, Drucker noted. Therefore, concentrate on using him in his area of specialization and do not force him to develop a skill that he will only work on under duress.

The speaker indicated that managers should realize they are being paid for enabling people to do their jobs. Managers and trainers must learn from the feedback they receive from technical staff members and be open to new concepts.

Since "one cannot manage subordinates as one cannot manage children," Drucker said the road to successful management is through personal example rather than "by the book." For that reason, the manager should constantly question his own strengths and weaknesses.

Major Shift

There has been a major shift in this country to an increased reliance on people rather than technology, Drucker said. This has been accompanied by "prodigious advances" in education. However, the first step in the educational process — making competent people out of beginners — is relatively easy. The process of converting incompetence into excellence is more difficult and is a problem faced by many managers today, he pointed out.

When Drucker completed the initial presentation and began answering questions from conference attendees, it became apparent that the education specialists and information systems managers were especially concerned with the shortage of competent technical specialists.

A major concern in the not-so-distant past was how to turn good programmers into effective managers. Now, things have changed to the point that one group wanted suggestions on how to dissuade technicians from going after management slots.

Assuming comparable economic incentives for both career paths, Drucker had two recommendations — neither of which he felt would draw cheers from the audience.

First, he recommended allowing programmers and analysts to try functioning as managers early in their careers. "Throw them in early and let them sink," he said. Many technicians will discover they do not like management and will return to the other side of the fence.

The second option is to decrease the status allotted to managers in many organizations. The manager could be treated as less of a boss and more of a resource. However, Drucker warned that an inherent risk tied to this choice is that managers may become less satisfied while the knowledge workers are increasing their satisfaction.

In response to a query as to what factors will motivate the knowledge worker and increase personal pride in his work, Drucker listed five items:

- Rewards should be issued for performance.
- People must be challenged by their work. "Nothing breeds cynicism like management that preaches one thing and rewards workers for something else."
- The job's critical factors should be determined from worker feedback and learning should be built into the job.
- Permissiveness is a negative factor. Managers should be pleasant and polite, but still demanding of subordinates.
- If managers cannnot build challenge into the job, they should hire people who will be challenged by the job. In other words, "Don't hire Phi Beta Kappas for the stockroom."

DS 180
180 CPS Matrix Printer

$1395.00
(*Introductory Price)

- Microprocessor Control
- 40 Programmable Features
- 180 CPS Print Speed
- 1000 Character Buffer (2,000 Optional)
- Bidirectional/Logic Seeking
- 9X7 Dot Matrix (Lower Case Descenders)
- 96 ASCII Character Set
- Expanded Characters
- 132 Column Print Width
- Adjustable Printhead/ 1-6 Copies
- Tractor Feed (Adjustable 3" to 15")
- Front or Bottom Paper Feed
- Top of Form
- Dynamic Form Alignment
- Non-Volatile Format Retention
- 6 or 8 Lines Per Inch
- Horizontal Tabs (Addressable & Absolute)
- Vertical Tabs (Addressable & Absolute)
- Perforation Skip-Over
- Auto Line Feed
- Auto End of Line Carriage Return
- 5 IPS Paper Slew
- Parallel and Serial Interfaces
- 110-9600 Baud Communications
- Terminal Status Indicators and Line Counter
- X-ON/X-OFF Synchronization
- DTR Synchronization
- Audio Alarm
- Self-Test
- Paper Out Sensor
- Cartridge Ribbon

*Available only thru 1980; 1981 pricing $1595.00 each.
Printer stand optional, $110.00 each.

PMS
Pacific Mountain States
Corporation
6319-B DeSoto Ave., Woodland Hills, CA 91367

QUANTITY DISCOUNTS AVAILABLE.
CALL (213) 999-2281

SAVE MONEY AND TIME WITH STRUCTURED DESIGN (SD)

OVER 10 YEARS OF EXPERIENCE IN THE DESIGN, DEVELOPMENT AND INSTALLATION OF COMMERCIAL APPLICATIONS USING STRUCTURED DESIGN

1. SD Information Package (Studies) Including Data Structure, Program Structure, Identification System of Components (a "Chart of Accounts" for Commercial Data Processing) and Cataloge of SD Products
Per Package $40.00
2. SD Documentation Package with 3-D Documentation, Including 3 Dimensional Display Documentation with colour transparencies, Working Pad for increased efficiency and improved quality of display documentation and 10 different forms for SD Documentation including IMS DPAGE, LPAGE & I/O Message Layouts
Per Package $80.00

SD Program Functions for 360,370,303X & 4300 (DOS-OS)

3. SD Program Module Package
Validation Routine, Date Routines, Edit Function, I/O Modules and a sample Driver for a total of 7 modules Per Package $180.00 one time lease
4. Support Software (per Order Form only)
System SDA Data Base Functions From $350.00 one time lease
System SVA Table Processing Functions From $450.00 one time lease
System S09 Data Library Functions From $450.00 one time lease
5. Integrated Applications System Structures (per Order Form only) for you to add your own modules From $900.00 one time lease

Computer Programs are distributed as relocatable or load modules (for DOS and OS respectively). Shipping & sales tax (if applicable) are additional.

PLEASE SEND CHECK OR MONEY ORDER TO:

INT'L DATA PROCESSING
20829 Anza Ave, #125
Torrance, CA 90503

Name ____
Company ____
Address ____
City ____ State ____
Zip ____ Phone ____

STD

SOFTWARE TECHNOLOGY DEVELOPMENT PRODUCTS & SERVICES
Now Offers:
- VECTORIZATION
- CODE CONVERSIONS
- CUSTOM CODE DEVELOPMENT
- STANDARD CODE PACKAGES

For
ALL MAJOR HARDWARE
(IBM, DEC, CDC, UNIVAC, CRAY, ETC.)

In the following fields:
1. **COMMERCIAL:** Financial and Executive Data Management, Decision Making, Interactive Report Generation, Operations Research, many others.
2. **CONTRACT PLANNING:** Work Breakdown Structure, Procurement Regulations, Job Costing, PERT, CPM, etc.
3. **GRAPHICS:** Interactive 3-D and Contour Plotting for Computer-Aided Design, etc.
4. **SCIENTIFIC:** Thermodynamics, Kinetics, Plasma Physics, Electrodynamics, Fluid Mechanics and Turbulence, many others.
5. **ENGINEERING:** Aerodynamics and Aeroelasticity, Heat Transfer, Magnetohydrodynamics, Electronics, Structures, Real-Time Simulations, Plant Systems & Design Analysis, many others.
6. **MATHEMATICS:** STD MATHPAC for Standard Mathematical Problem Solvers, Including Multidimensional P.D.E. Solvers, Advanced Matrix Operations, many others.
7. **SYSTEMS PROGRAMMING:** Operating Systems, Programming Aids, Device Drivers, etc.

STD ENGINEERING CORPORATION
P.O. Box 3009, Arcadia, CA 90016
Tel. (213) 574-7997 or (213) 574-7759

INTRODUCING THE EMULATOR™

The trouble with video terminals today is that most of the low-cost models just don't have the performance to handle your tough applications. And the few that do are usually not compatible with your existing system. But now, Intertec has resolved this age old dilemma with the introduction of its new Emulator™ Video Terminal.

The $895* Emulator™ performs exactly as you command. With the depression of just a few keys, Emulator users can select terminal control codes of any one of four popular video terminals. The Lear-Siegler ADM-3A. The Soroc 1Q-120. The DEC VT-52. Or the Hazeltine 1500. Incredible! It's like having four terminals for the price of one.

But, best of all, not only does the Emulator replace these terminals, it outperforms them by offering enhanced user-oriented features. Features that those other terminals just don't have - at any price.

Standard Emulator™ features include: a sharp, crisp 12" non-glare screen with a full 24 line by 80 column display. Twin RS232C serial ports - one for the host computer and one for your printer. Four separate cursor control keys. A separate 18 key numeric pad. Keyboard selectable baud rates and operating modes. And, a host of visual attributes.

No matter which dumb or smart terminal you're using today, don't buy another until you check out our new Emulator™. You'll get the performance of four terminals for the price o one. And you'll probably save hundreds of dollars over the price you paid for your last terminal. Plus, you'll get unparalleled reliability, nationwide service and quick delivery. Call or write us today for all the details. Intertec terminals are distributed worldwide and may be available in your area now.

INTERTEC
DATA
SYSTEMS®
2300 Broad River Rd, Columbia, SC 29210
(803) 798-9100 TWX: 810-666-2115

*Quantity one - Dealer inquiries invited.

Computer Sciences Corporation believes that any problem humans can conceive of, they can eventually solve. The only limitation is the sophistication of their science. That belief has involved us in many of the world's most difficult problems and in some of its most astonishing accomplishments.

It has also made CSC the world's largest information services company. That may surprise you. Almost everyone knows what we've done, but hardly anyone knows that CSC has done it.

As NASA's computing partner, CSC has developed programs and systems and handled data processing for the missions that have orbited the earth and explored the solar system.

By integrating the technologies of software, communications and hardware, we are continuously advancing the techniques of problem solving.

CSC is developing the capacity of history's most profound tool, the computer, to change man's relationship with everything he has ever known.

It's the ultimate challenge. Maybe you'd like to help us. If responsibility scares you, turn the page. But if you think you're good, and you're not afraid to find out how good you really are, you should be in touch with CSC.

We're looking for people who are not afraid of anything.

CSC
COMPUTER SCIENCES CORPORATION
Corporate Offices: 650 N. Sepulveda Blvd., El Segundo, CA 90245 · 6565 Arlington Blvd., Falls Church, VA 22046
An Equal Opportunity Employer

WE HAVE MORE FINANCIAL & MANUFACTURING SOFTWARE PACKAGES FOR MORE COMPUTERS THAN ANYONE.

Some software vendors offer a limited number of products for one or two types of computers. Software International supports 87 different financial and manufacturing packages for 31 different models of popular computers. Whether you have a small or large *IBM* system, *Burroughs, DEC, Hewlett-Packard, ICL, Microdata, Prime, Univac* or *Wang,* we have your application software.

Financial Packages include General Ledger, Accounts Receivable, Accounts Payable, Fixed Asset Accounting, Payroll/Personnel and Work Order Management. Manufacturing Resource Planning ranges from Material Requirements Planning, Master Production Scheduling and Capacity Planning to Shop Floor Control and Purchasing. They all produce the results more than 3,000 knowledgeable computer users worldwide have come to expect from the leader in application software.

CALL US.
WE'RE THE LEADER.

Call or write today. Because the more you know about software packages, the more you'll understand why we're the leader.

SOFTWARE INTERNATIONAL®
Elm Square, Andover, MA 01810 (617) 475-5040

Atlanta (404) 955-3705
Boston (617) 729-8962
Chicago (312) 298-3500
Columbus, OH (614) 773-2167
Houston (713) 444-3348
Los Angeles (213) 573-0402
New York (914) 253-8050
San Jose (408) 292-9700
Toronto (416) 924-1461
Vancourver (604) 669-6122

OFFICES AROUND THE WORLD

Policy Agenda Suggested

Carter Technology Report Points to Social Issues

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The social implications of rapidly expanding information technology were identified as major "emerging policy issues" in a recent Presidential report to Congress.

The "abundant technological capacity" of computer and communications networks "poses numerous and far-ranging information-related policy issues," according to President Carter's second annual science and technology report.

The report serves to suggest a federal science and technology policy agenda for the coming years.

The document, prepared by the National Science Foundation this summer, was presented to Congress Nov. 12. In submitting the report, Carter said "careful and systematic assessment of scientific and technological development remains crucial to the formation of effective public policy."

The report highlighted Carter administration activities in support of science and technology and recent advances in various related areas, such as nuclear waste management, health, energy R&D, space exploration, transportation and agriculture.

Turning to science and technology on a general level, the report said "a central theme of the administration's science and technology policy has been to provide real and immediate growth in support of basic research to build a solid foundation for the solution and avoidance of future problems."

Emerging Issues

After a discussion of the federal government's role in improving state and local use of science and technology and its role in developing and commercializing new technology, the report briefly discussed emerging issues, including information and communications "in the computer age" and privacy and computer data bases.

Noting the rapid expansion of computer technology through large-scale integrated circuits, the report looked ahead to coming use of such sophisticated technologies as bubble memories and Josephson junctions.

These technologies, coupled with a great increase in the number of communications satellites, will facilitate numerous new uses of computer networks.

Also, advances such as fiber optics are leading to greater business communications capabilities through both land-based and satellite-based transmission systems.

Three Categories

The associated policy issues are "far ranging," the report noted, breaking them into three categories.

- Issues regarding the technology and its social control through regulation. Here the report mentioned the blurring distinctions between computer and communications technologies, resulting in increased regulatory activity by both Congress and the Federal Communications Commission.

"There are personal as well as business implications here," the report said. "If home computer terminals become a major channel for mail, consumer information, education, political campaigning and perhaps even for voting, they may end up being as important in the 21st Century as the printing press has been for the past 500 years."

- Issues related to industrial applications of technology, such as electronic mail and funds transfer systems. The latter example "shows both how a new technology can affect a primary information sector group" and in turn "raise numerous policy issues for the federal government."
- Issues concerning access to information and its general effects on society – "ideological and policy issues involved with access to and use of information. As a higher value is placed on possessing and using information effectively," the report said, "those who are informative – rich may have an advantage over those who are information-poor.

Uneven Distribution

"As newer and more sophisticated information technologies are developed, economic, education, social and motivational factors may create an uneven distribution in the ability of people to make use of them. Simply improving equality of access to such technology . . . does not necessarily convey ability to use the technology, since this depends on information already in the possession of the potential user.

"Whether attempts should be made to promote equal ability to use the technology remains an open question," the report concluded.

Social Issues

While these new technologies "present opportunities for increased efficiency and productivity, they also exacerbate many important social issues involving the maintenance of personal privacy in a computerized society."

Therefore, a major issue arising from this growth in technological capability is whether a policy based upon indi-

(Continued on Page 24)

A TIMEPLEX CUSTOMER REPORT ON STATISTICAL MULTIPLEXING.

Eight California-based companies of the Alco Standard Corporation use the Timeplex SERIES II MICROPLEXER™ * to concentrate the input/output of up to 30 terminals linked to a computer in Valley Forge, Pa.

This network is managed by Alco Data Services, which offers computer services to the 130 companies that comprise Alco Standard Corporation.

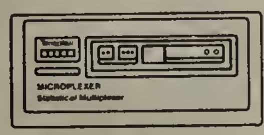
"Effective network management and control are indispensable," according to Norm Pfizenmayer, Corporate Director, Alco Data Services, "since our West Coast companies use the system for a variety of crucial on-line applications, including inventory control, accounts receivable, accounts payable and general ledger, to name a few."

The SERIES II is equipped with a unique Supervisory Port option–a window into the network–which provides key operating statistics and diagnostic information to the user, without interfering with the function of the system.

States George Kovolenko, Senior Communications Consultant, Alco Data Services: "One person, sitting at a CRT here in Valley Forge, easily monitors the system. At the same time, the operator can automatically downline program any multiplexer channel in the system, even those in California–all from the front panel of the master unit."

Concludes Mr. Kovolenko: "As far as multiplexers are concerned, we needed advanced features, flexibility and reliability. And we found it with the Timeplex MICROPLEXER."

Use the handy coupon to check Timeplex out for your company. Or call us toll-free at 800-431-2918, Extension 230. For New York: 800-942-1216, Extension 230.

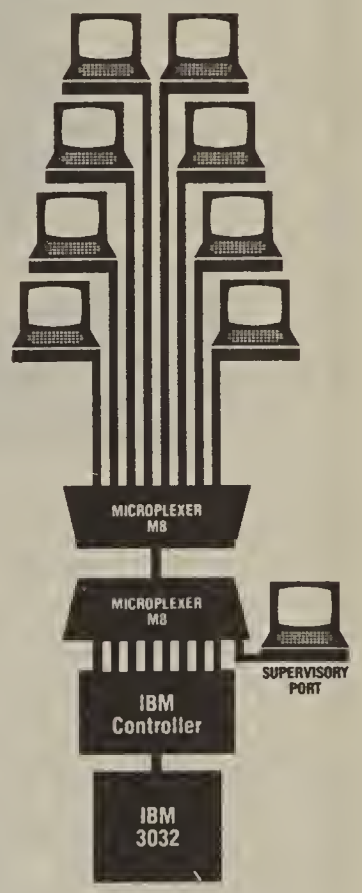


Timeplex®

Timeplex, Inc./One Communications Plaza
Rochelle Park, NJ 07662
(201) 368-1113 TWX: 710-990-5483

"At Alco, we rely on the unique Timeplex multiplexer to monitor a network linking eight California companies. All from a single CRT 3,000 miles away."

George Kovolenko
Senior Communications Consultant
Alco Data Services



This West Coast data communications network, which is managed by Alco Data Services, is based on SERIES II MICROPLEXER statistical multiplexers located in Los Angeles, California and at the Corporate Data Center in Valley Forge, Pennsylvania.

* Patents pending

CHECK US OUT.
ONLY TIMEPLEX CAN DO IT.

I have —— terminals, —— ports.

My application(s):
☐ Time-sharing ☐ Interactive
☐ Other————
Please send the following:
☐ Alco Data Services Case Study
☐ Handbook on Statistical Multiplexing
☐ Please call me.
I have an immediate need.

Name
Title
Company
Address
City/State/Zip
Telephone #CWD/120180

Send coupon to: Timeplex, Inc.
P.O. Box 5006; Clifton, N J. 07015

IEEE Local Net Standard Expected Next Year

By Brad Schultz
CW Staff

BEAVERTON, Ore. — The Institute of Electrical and Electronics Engineers (IEEE) will probably issue a standard for a local data network architecture in the last few months of next year, according to Maris Graube, chairman of the IEEE's Local Area Networking Committee.

The committee will meet next week to resolve one last snag in emerging IEEE Standard 802: how to distribute access rights in a local loop.

Two approaches are under scrutiny, Graube told *Computerworld*. A method known as carrier sense multiple access collision (CSMA/CD), which is featured with the Ethernet architecture announced by three vendors recently, involves statistical sampling of line traffic.

Roughly speaking, the user must wait if line monitors detect collisions between his traffic and other traffic on a line.

The other method is called token passing and avoids such collisions by allowing only one user to transmit on a line at one time, Graube indicated.

Access Rights

Members of the IEEE committee are also debating whether or not to give the standard provisions for assigning priorities of access, allowing some users of a local loop more access rights than others. A few committee members have argued that the high speeds eventually possible in local network architectures make priorities of access meaningless in practice because wait times for low-priority users would be virtually the same as for high-priority users, Graube noted.

Standard 802 will specify a "media access unit," which Graube said was a kind of modem allowing various interfaces to data terminal equipment in a local network. Besides a purely coaxial interface, this unit would feature an interface for media such as fiber optics that are likely to be popular with local net users in the future, he explained.

The IEEE local net committee wants a "universal" interface that will accept a range of media so that architectures will not be rendered obsolete by fast-breaking innovations in link technology, Graube added.

In drafting standard 802, the committee has concentrated on an architecture appropriate for distances of up to 1 km between nodes of a local net, he continued.

The committee has tentatively settled on four speeds for transmission between nodes: 1M-, 5M-, 10M- and 20M bit/sec. Ethernet, in contrast, is pegged for 10M bit/sec transmissions.

Bottom Layers

The committee has also confined its attention to the lowest two layers of the International Standards Organization's open systems interconnection reference model.

These layers concern physical interconnection between data terminal equipment and links (layer one) and the High-Level Data Link Control protocol (layer two).

According to Graube, these layers are likely to be addressed by the makers of semiconductor chips: The committee wanted to standardize the design of chips used at these layers to lower their cost and facilitate network modifications.

Following next week's meeting, a draft of standard 802 should be ready in first quarter 1981, Graube remarked.

After review by the data communications community, the draft will probably go to the IEEE Standards Board for approval next summer, Graube predicted.

Report Outlines Social Issues

(Continued from Page 23)

vidual access and responsibility as the principle mechanism for protecting information privacy is adequate."

"It seems clear," the report said, "that individuals are in a poor position to police the record-keeping or record-sharing activities of organizations with which they have little or no direct contact."

The growing size of record-keeping organizations and the ease of combining, analyzing and interpreting stored data afforded by computer technology means "individuals have little leverage or bargaining power in their dealings with such institutions," the report noted.

"It is unrealistic to expect individuals to guard their information rights aggressively in these situations," according to the Carter report, which noted the privacy legislation put forward during this administration.

Introducing the IPL 4400 Series:

The fastest 4300 on the market today.

Today.

IPL outperforms IBM every way you look at it.

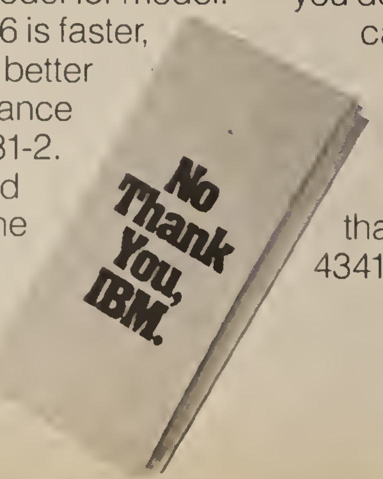
The new IPL 4400 family of 4300-compatible mainframes outperforms IBM 4300 Series mainframes model for model.

The IPL 4436 is faster, and gives you better price/performance than IBM's 4331-2. When you need more power, the IPL 4436 can be easily field-upgraded to the IPL 4443.

The IPL 4443 outperforms IBM's 4341-1 for most applications, costs less, and gives you double IBM's memory capacity. What's more, we'll deliver your IPL 4443 as soon as we get your order.

IPL's 4446 is faster than IBM's newly-announced 4341-2 for most applications, costs less, and is field-upgradeable from the IPL 4443. First customer shipments of the IPL 4446 will be made in the third quarter of 1981.

To find out more about the new IPL 4400 family, call your local IPL representative. Or call or write: Vice President, Sales, IPL Systems, Inc. 360 Second Avenue, Waltham, Massachusetts 02154. (617) 890-6620.


No Thank You, IBM.

ipl SYSTEMS INC.

ADM-3A USED $525
ADM-2 USED $795
IMMEDIATE DELIVERY
30 DAY WARRANTY

USED COM DATA COUPLERS	$100
USED VENTEL COUPLERS	$100
USED TECHTRAN 8400	$695
USED DTC 300	$895

TBC
TERMINAL BROKERS COMPANY
Box 312 • 37 Franklin Street
Needham, MA 02192
Call (617) 449-0216
Some Items Limited Quantity

Such as Long-Term Investment

Strategics of Productivity Urged for Industry

By Bruce Hoard
CW Staff

CHICAGO — American industries are unwilling to pay the dues needed to increase productivity, Daniel T. Carroll, president and chief executive officer of Hoover Universal, Inc. told conferees at Info/MFG here recently.

Instead, they emphasize bottom-line profits to the exclusion of less exciting and less lucrative issues such as long-term investment and asset accumulation, he maintained.

"I think the lack of productivity is the root of inflation, the root of high taxes and perhaps the root of the demise of Jimmy Carter," the CEO said. "And it will be the root of Ronald Wilson Reagan's downfall, too, if he doesn't watch out for it."

Carroll also cited the decline in U.S. investment in industrial equipment and the lack of interest in operations management careers as antecedents to our current economic malaise. Operations management is the function most likely to get "down and dirty" with productivity, he claimed.

Technology is being touted as the best way to increase productivity, he said, adding technology in the U.S. is not producing as much in the way of productivity gains as in countries such as Japan and West Germany.

Productivity Strategies

In order to face the productivity problem square up, and beat it, U.S. industry should adapt what Carroll dubbed "strategics of productivity." Those individual elements of strategy are designed to deal with our most basic productivity woes, he stated.

Ticking off a series of ideas, the president decried the inadequate demand for business segments that offer unusual productivity leverage. Instead, he argued, businesses have maintained a "vainglorious" effort to sustain segments with only marginal productivity.

Maintaining these marginal areas is seen as a challenge or test to management, while needed technological, volume and growth segments are left to wither, Carroll said.

What we should do is give up on segments that are losers, as the Japanese did with shoe manufacturing and shipbuilding, and concentrate on such areas as semiconductors and pharmaceuticals, he claimed.

Fatal Fixation

Somewhat contradictorily, he declared U.S. research and development efforts should not be heavily focused on products responding to a technology push or market pull. "We have a fatal fascination with Alexander Graham Bell and the wonderment of market research," he said.

The result of such a fixation is a "great void." Rather than look for the next xerographic process or the next telephone discovery, productivity should be the immediate goal. But "productivity is not glamorous, productivity is not exciting and, therefore, productivity is ignored," he said.

Marketing is another obstacle to increased productivity, according to Carroll. It compromises productivity by agreeing to unreasonable delivery dates and pricing arrangements that do not deliver the cash flow necessary to increase productivity, he said.

When making capital investment decisions, estimates of the degree and longevity of productivity improvement should take precedence over the high cost of money and the risks of capital intensity, he commented.

Elaborating, he explained, "There is a need for management to develop programs that provide good training and experience in the identification, realization and measurement of productivity opportunities." Only now are graduate business schools stressing such an approach, he added.

Industry Decentralization

The decentralization of American industry was the CEO's next target. It is decen-

(Continued on Page 28)

THREE IBM EDUCATION COURSES
- Top-Down Software Design
- Application Test and Maintenance
- Implementing Software Inspections

Learn more productive software engineering techniques.

These three courses, developed and proven by IBM, have a single. goal: increased productivity.

The total curriculum teaches you how to design and produce more reliable, less error-prone application software–with built-in planning for easier maintenance and for future enhancements. Taken in any sequence, each course teaches the professional techniques that can help you come closer to satisfying both executive and user requirements. Each course stresses extensive case studies and workshops. All three are ideal for data processing managers and senior programmers and analysts.

Top-Down Software Design teaches you to recognize what is good and bad in design and implementation. Using top-down techniques, systems can be more easily designed and understood. Significantly, the procedures you are taught are as effective for on-line environments as for batch processing. In both cases, the total amount of development time can be reduced. Tuition is $885 for the four-and-a-half-day course.

Application Test and Maintenance shows you techniques to help reduce total maintenance time–the biggest cost in programming today. By learning how to better manage the maintenance process, time can be cut and productivity increased. The course teaches thorough testing procedures as well as methods to design more effective test cases. Tuition is $875 for the four-and-a-half-day course.

Implementing Software Inspections teaches procedures for the early detection of errors in both design and programming. The earlier errors are detected and corrected, the lower software development costs will be. The course outlines specific steps for the formal inspection of designs, code and test cases. As a result, programs can be delivered with fewer errors. Tuition is $539 for the three-day course.

Courses are held regularly in New York, Los Angeles, Chicago, and Dallas. For more information and current schedules, call our educational representative at (212) 983-4079 or send us the coupon.

IBM Data Processing Division
Systems Science Institute
205 East 42nd Street
New York, NY 10017

Telephone: (212) 983-4079

Please send me more information on:
☐ Top-Down Software Design
☐ Application Test and Maintenance
☐ Implementing Software Inspections

Name ____________
Title ____________
Company ____________
Address ____________
City ____________ State ____________ Zip ____________
Phone ____________

IBM®
Data Processing Division

MRP Viewed Slashing U.S. Air Freight Bill

By Bruce Hoard
CW Staff

CHICAGO — If used judiciously, computer-based materials requirements planning (MRP) would alleviate much of the nation's $100 million annual air freight bill by reducing superfluous inventory transactions, the acknowledged "father of MRP" said here recently.

Speaking at Info/MFG, sponsored by Clapp & Poliak, Inc., Joe Orlicky of Orlicky Consulting and Educational Services repeatedly lashed out at the top managers who allegedly refuse to embrace MRP.

He also downplayed the importance of the computer hardware and software that power it.

MRP, which, as it becomes better known, is increasingly referred to as "manufacturing resource planning," is based on a series of minicomputers tied into a central mainframe.

The minis are distributed at key sites throughout the manufacturing workplace and monitor processes such as inventory, scheduling, work and purchase orders. The goal of MRP is to achieve maximum production efficiency through the fewest necessary inventory transactions and the maximum concentration of workers on high priority projects at all times, Orlicky explained.

Untapped Potential

So far, the ideal has been more attractive in theory than in fact, Orlicky noted. Despite what he referred to as a "track record that is mixed at best," the MRP pioneer was adamant about the largely untapped potential of his brain child.

Referring to the conference's keynote speech on productivity given by Daniel T. Carroll, the combative Orlicky described it as "an intellectual exercise that was not helpful" (see related story on Page 25). Carroll's ideas were "long-range solutions" that would require an organic restructuring of the economy and "billions of dollars," he said.

MRP, on the other hand, requires little investment and offers fast payback at a time when Labor Department figures reflect productivity decreases in six consecutive quarters, he said.

Currently, there are about 2,000 MRP systems in place, and the majority of them are not realizing the expectations of their owners, he said. On the positive side, some have "succeeded brilliantly" and others have been "out-and-out failures.

"With MRP, if you don't do it well, you'll end up worse than you were when you started out," Orlicky declared.

A good system reflects the amount of demand for a material, tells when a given amount will be needed and describes how to meet the demand, he said, adding MRP can save a great deal of time by detecting purchase and shop orders whose due dates have passed, rendering them invalid.

Scheduling Top Priority

Scheduling, not inventory management, is the top priority of MRP, Orlicky stressed. "Manufacturing inventories cannot be managed in their own right. The purpose of inventories is to support production schedules. The secret to better scheduling is MRP."

MRP is frequently "installed," but muct less frequently fully "implemented," and the blame for that "belongs with top management and no one else," he said. "They have not established the procedural and human environment necessary to operate the system."

Furthermore, there is far too

(Continued on Page 28)

DECwriter IV.
The terminal that's easier to use is now easy to buy.

Where to buy DECwriter IV's,

ALABAMA
Birmingham
Modems Plus
(205) 978-8945
Huntsville
J.L. Highsmith & Co.
(205) 536-6666
ALASKA
Anchorage
Bagoy and Associates
(907) 274-8531
ARIZONA
Phoenix
American Teledata
(602) 271-0500
Terminal Rentals, Inc.
(602) 258-4466
Scottsdale
BFA Corporation
(602) 994-5400
CALIFORNIA
Burlingame
Data Access Systems
(312) 967-0440
Data Rental/Sales, Inc.
(213) 559-3822
Culver City
Data Rental/Sales, Inc.
(213) 559-3822
Irvine
Computer DataCom
(714) 540-6327
Los Angeles
The David Jamison Carlyle Corp.
(213) 277-4562
Redondo Beach
Consolidated Data Terminals, Inc.
(213) 970-1030
Sacramento
Consolidated Data Terminals, Inc.
(916) 924-1644
San Diego
Data Systems Marketing
(800) 854-2684
(800) 532-3717 (Calif. only)
San Jose
Terminal Rentals, Inc.
(408) 292-9915
San Mateo
U.S. Instrument & Rentals
(415) 574-6006
Santa Clara
Continental Resources
(408) 727-9870
Tustin
Terminal Rentals, Inc.
(714) 832-2414
West Los Angeles
Carterfone Communications Corp.
(213) 879-1871
COLORADO
Denver
American Teledata
(303) 427-2121
BFA Corporation
(303) 371-2422
CONNECTICUT
Wallingford
Computrend, Inc.
(203) 265-2841
FLORIDA
Orlando
J.L. Highsmith & Co.
(305) 293-5202
Pensacola
Digital Systems, Inc.
(904) 434-2685
Tarpon Springs
Data Rental/Sales, Inc.
(213) 559-3822
GEORGIA
Atlanta
Modems Plus
(404) 378-5276
IOWA
Davenport
Lerch & Thorn
(319) 324-4091
ILLINOIS
Bensenville
Alanthus Data Communications Corp.
(312) 860-2233
Chicago
The David Jamison Carlyle Corp.
(312) 975-1500
Loonam Associates, Inc.
(312) 833-5831
U.S. Robotics
(312) 346-5650
Des Plaines
National Computer Communications Corp.
(312) 296-0830
Downers Grove
Parker Business Services, Inc.
(312) 629-7806
Elmhurst
ICE, Inc.
(312) 279-1960
Morton Grove
Data Access Systems
(312) 967-0440
Rock Island
Lerch & Thorn
(309) 788-4533
Westmont
Telcom Products, Inc.
(312) 960-4090
(800) 323-7385
INDIANA
Indianapolis
Computer Systems Corp.
(317) 298-7200
South Bend
Credit Bureau of South Bend
(219) 236-5600
KANSAS
Shawnee Mission
Inland Associates, Inc.
(913) 362-2366
LOUISIANA
New Orleans
Tano Corp.
(504) 568-1650
MARYLAND
Gaithersburg
Continental Resources, Inc.
(301) 948-4310
Rockville
Alanthus Data Communications Corp.
(301) 770-1150
MASSACHUSETTS
Bedford
Continental Resources, Inc.
(617) 275-0850
Boston
American Computer Group
(617) 261-2700
Needham Heights
National Computer Communications Corp.
(617) 444-6822
Wakefield
Selecterm
(617) 246-1300
Woburn
Computrend, Inc.
(617) 272-8372
(800) 225-5378
MICHIGAN
Benton Harbor
Heath
(616) 982-3200
Brighton
Dacoterm
(313) 453-7250
MINNESOTA
Minneapolis/St. Paul
Computer Marketing Corp.
(612) 894-7150
Tele-Terminals
(800) 328-3072
Minneapolis
Loonam Associates, Inc.
(612) 831-1616
MISSOURI
St. Louis
Computer Marketing Corp
(314) 434-1844
Inland Associates, Inc.
(314) 821-3742
NEW JERSEY
Allendale
Leaseametric
(415) 574-4441
Blackwood
Data Access Systems
(609) 228-0700
Fairfield
Carterfone Communications Corp.
(201) 575-6500
Matawan
The David Jamison Carlyle Corp.
(201) 946-9669
Mountain Lakes
Walsh Associates, Inc.
(717) 346-3856
Somerville
Unitronix, Inc.
(201) 874-8500
Springfield
Terminal Sales & Development, Inc.
(201) 376-8980
Union
Transnet, Inc.
(201) 688-7800
Wharton
ADL Enterprises, Inc.
(201) 328-1360
NEW MEXICO
Albuquerque
BFA Corporation
(505) 292-1212
NEW YORK
Albany
J. Cameron Associates
(518) 371-5947
Binghamton
Ossman Instruments
(607) 785-9947
Great Neck
M.T.I.
(516) 482-3500
Hollis
Synchro Sound
(212) 468-7067
New York
Alanthus Data Communications Corp.
(212) 688-2615
National Computer Communications Corp.
(212) 354-9866
Rochester
Computrend, Inc.
(716) 244-1075
(800) 462-6436
J. Cameron Associates
(716) 385-1681
WNYC
(716) 381-4120
Ossman Instruments
(716) 473-5720
Syracuse
Ossman Instruments
(315) 437-6666
NORTH CAROLINA
Charlotte
J.L. Highsmith & Co.
(704) 333-7743
(800) 438-4942
NORTH DAKOTA
Fargo
Tele-Terminals
(800) 328-3072
OHIO
Akron
CBC Services
(216) 867-0780
Beachwood
M.T.I.
(516) 482-3500
Cleveland
Data Tron
(216) 585-8421
Columbus
CBC Services
(614) 222-5496
Dayton
C.G. Distributors
(513) 435-4340
Dublin
Scherer's Mini-Computer Mart
(614) 889-0810
OKLAHOMA
Oklahoma City
Tel-Tex, Inc.
(405) 947-3797
OREGON
Beaverton
Datec
(503) 641-6644
PENNSYLVANIA
Pittsburgh
C.G. Distributors
(412) 366-5056
(800) 245-4120
Scranton
Walsh Associates, Inc.
(717) 346-3856
TEXAS
Addison
Data Applications
(214) 931-1100
Tano Corp.
(214) 661-1370
Dallas
Carterfone Communications Corp.
(214) 350-1294
Houston
Data Applications
(713) 686-8413
Tel-Tex, Inc.
(713) 868-6000
Richardson
Tel-Tex, Inc.
(214) 231-8077
San Antonio
Data Applications
(512) 732-7176
VIRGINIA
Richmond
J.L. Highsmith & Co.
(804) 272-5888
WASHINGTON
Redmond
Consolidated Data Terminals, Inc.
(206) 883-0100
Seattle
Datec
(206) 575-1470
WISCONSIN
Milwaukee
Loonam Associates, Inc.
(414) 548-9790
Tele-Terminals
(800) 328-3072
CANADA-BRITISH COLUMBIA
Burnaby
Algo Communication Products, Ltd
(604) 438-3333
CANADA-ONTARIO
Markham
Canterm Communications
(416) 495-5700
CES Electronic Systems Group Ltd.
(416) 495-5555
Lanpar Ltd.
(416) 495-9123
Teleterm Ltd.
(416) 495-5666
Mississauga
Data Terminal Mart
(416) 677-0184
Toronto
Hamilton Rentals
(416) 251-1166
CANADA-QUEBEC
Montreal
Spectra Colour, Ltd.
(514) 739-2153
Telcor
(514) 337-6020
CANADA-MANITOBA
Winnipeg
Electro Systems Group, Ltd.
(204) 772-9411

Why Wait?

IBM 3101
Delivery NOW!
from $1195
- Leases Available -
CALL 617-437-1100
AMERICAN TERMINAL
Boston Mass 02215

Reactions Mostly Favorable

Lure of Productivity Draws 4,500 to Info/MFG

By Bruce Hoard
CW Staff

CHICAGO — Drawn by the lure of increased productivity and more stringent control over manufacturing processes, some 4,500 people came through the turnstiles at the first Info/MFG conference and exhibit, held here recently.

Reactions to the show, which featured 42 conference sessions and 79 exhibitors, was mixed, but generally favorable. On the positive side, the overall organization won praise. On the negative side, many attendees were talking about IBM and Digital Equipment Corp. — neither of them were represented.

The vendors who were displayed an array of manufacturing-oriented hardware and software, ranging from bar code readers to materials requirements planning (MRP) systems — highly desired, but not yet proven under fire.

> *'The way it's going, software packages with basic data bases, which users can use to massage data without going through the data processing department, will become very popular.'*

Conference attendees heard a host of manufacturing company executives hold forth on 12 basic subject areas including materials management, closed loop manufacturing systems, human resources and computer-aided design.

Satisfied Vendor

Michael Ehrensberger of Cincom Systems, Inc. was one of many vendor representatives who expressed satisfaction with the show. He said it represented the ever-growing number of manufacturers in the $30 million range who are getting the itch to buy minicomputers and take a direct stab at manufacturing control.

Gerald B. Mendelbaum, management systems analyst for Burroughs Corp., echoed similar thoughts on manufacturing trends. "I think the way it's going, software packages with basic data bases, which users can use to massage data without going through the data processing department, will become very popular," he said.

Nancy Campbell, marketing services coordinator for Ask Computer Services, Inc., said the show was filling "a definite void."

In her opinion, smaller manufacturers stand to gain from the minicomputer boom. "Judging from our sales, the small manufacturers can now find something that will fit their businesses that's user-oriented," she said. "The marketplace is huge."

Donald T. Wang, manager of project and data base administration for Mid-America Computer Corp., attributed the size of the crowd to an increased interest in automating manufacturing.

More and more people are moving the computer out of the computer room onto the shop floor and "into the hands of the guys who have the problems," according to Dick Lingeman, manager of manufacturing industry marketing for Honeywell, Inc.

It's easy to understand why the DECwriter IV's are so popular. In addition to being productive, versatile, and reliable, the DECwriters are easy to install, easy to use, and easy to maintain. And now we've added another easy feature. Easy to buy.

Just look through our list for the dealer nearest you. Chances are, there's one right in your area. Call and you'll get top quality Digital teleprinter terminals at a surprisingly low price.

The DECwriter IV is a desk-top, microprocessor controlled terminal with the performance and solid state reliability that made Digital's 300 baud terminals consistent best sellers from one of the leading manufacturers in the field.

A DECwriter IV is so easy to install, you can do it yourself. Or have a Digital's terminal dealer or field service engineer do it for you.

And it's easy to use, because our printer has the feel and operation of a typewriter. With snap-in ribbon cartridge, sculptured keys, and clear character printing. It's also small and lightweight enough to be easily moved.

Yet while it's small, its performance isn't. Digital's terminal prints the full ASCII character set; gives you switch selectable 110 and 300 baud rates; a 45 cps catch-up rate so you get true 30 cps throughput — ideal for most business applications. The printer operates full duplex, or full duplex with local echo.

Plus, it comes with EIA RS232C interface for use with all popular modems and acoustic couplers.

What's more, the DECwriter IV is so versatile, it can be used for a wide variety of office functions.

And with easily-accessible parts, maintaining the DECwriter is simple and fast.

The DECwriter IV Model DA offers exceptional flexibility in paper handling. So you don't put up with 8½ by 11 inch paper sideways, or with the short shelf life of thermal paper. All of which makes the Model DA ideal for most terminal applications. In the standard friction feed configuration, you can use roll or sheet paper in any width from 3 inches up to 14⅞ inches.

Take a few seconds to snap in the tractor feed option, and the Model DA handles continuous forms, in up to four parts.

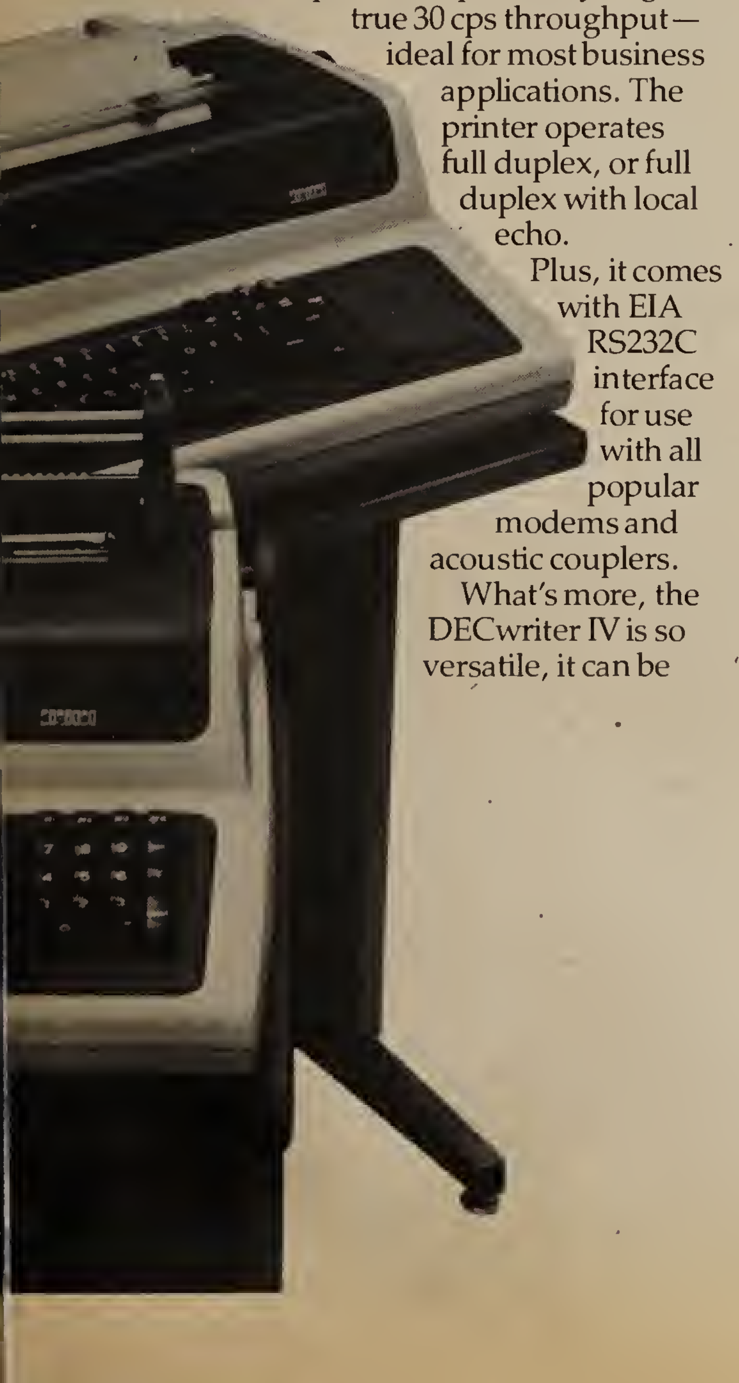
The DECwriter IV Model AA offers greater flexibility in forms handling. Because it gives you user-programmable "top of the form." Which means you get synchronized printing from one form to the next, continuous or custom. Programming is possible from the keyboard or computer.

In addition, the Model AA Offers 212 modem compatibility, international character set printing, plus super and subscript printing with roll or sheet fed paper. Keyboard selectable features include parity, local echo and last character visibility so the printhead moves aside as desired.

With both the Model DA and AA, characters can be condensed to 16½ per inch so you can get 132 characters across an 8½ inch sheet for paper and filing economy. Characters can be expanded to 5 per inch with the AA or 10 per inch with the DA.

The DECwriter IVs — while they've always been easy to appreciate, they've never been easier to order.

So call your local terminals dealer today. Or write **Digital Equipment Corporation,** Terminals Product Group, MR2-2/M67, One Iron Way, Marlboro, MA 01752. Tel. (617) 467-7068. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment Corporation of Canada, Ltd.



digital

We change the way
the world thinks.

Why Wait?

DEC
LA120

Delivery NOW!

-LARGE QUANTITIES-
Leases Available

CALL 617-437-1100

AMERICAN
TERMINAL

Human Interaction Seen Vital to Manufacturing

By Bruce Hoard
CW Staff

CHICAGO — Good communication between top management, middle management and end users is a must if manufacturing systems are to be successful, Odell Richardson, manufacturing consultant for Univac told attendees at the Info/MFG conference held here recently.

And it is top management who must initiate not only communication, but all other phases of a new system. In order to do that, they must actively monitor and use the system while it is being designed and implemented, the consultant said.

Richardson depicted system implementation as an interlocking process by which there is always interaction between all concerned parties.

Top managers are responsible for planning, approving and funding. In addtion to those exclusive responsibilities, they must also guide middle management in its role as the day-to-day leaders in a new system.

In its leadership role, middle management is held accountable to end users who are familiarizing themselves with the system.

Like top management, they must tend to their exclusive duties as well as oversee the next echelon of employees, Richardson said.

"There needs to be a people to people communication of attitudes involved in the project, no matter what sphere of influence they are in," he noted.

Human Integrity

The consultant stressed the importance of human integrity in system building, saying people are the most important building block. They should at least have an aptitude for what they will be doing, if not previous experience, he stated.

Even though such requirements seem obvious, they are frequently not met, he said.

A "climate of coordination" should be created around systems development to encourage maximum productivity. Such a climate makes it possible for employees to evaluate themselves, saving the time of managers who might be otherwise responsible for doing so, the consultant commented.

Motivating top management to actively participate in a project throughout its development is a difficult task. Because they are torn by other duties, they frequently delegate their responsibilities to underlings who often lack the desire or power to get things done, Richardson claimed.

However, top management is not amenable to comments and especially criticisms from middle management and end users who are mostly intimately involved with the development process, he added.

"They become very irritated if someone lower down tells them what's wrong because it doesn't fit the social order of the company."

So, rather than listen to free advice from within, top managers solicit the help of consultants, who charge up to $600 a day to tell them what could have been had for nothing. Added to that, the system frequently collapses when the consultant leaves, Richardson noted.

The key to avoiding such pitfalls is a management commitment and systematic review in the form of a weekly progress meeting, he said. The meeting should never be more than an hour long and should confine itself to a specific, preset agenda.

Items to be discussed include delayed tasks, completed tasks, work in progress, future jobs and major milestones. "You discuss these things, and when you're finished, that's the end of the meeting," he said. "If you want to talk about something else, call another meeting."

MRP System

Richard Burns, MIS director for Hollister, Inc., described the efforts his company is making toward implementing its second materials requirements planning (MRP) system. The human element of that system is being handled very carefully, he claimed.

An MRP system is a computer-based manufacturing control system designed to achieve more efficient production processes through tight inventory and scheduling control.

After the go-ahead was given for a second system, (the first one failed) top management realized the need for user education for all potential users, Burns said. That need is currently being met through a series of classes on site and in Chicago.

Some of the problems the company has faced include relocation to a new corporate headquarters, requiring the purchase of new DP equipment, and the incompatibility of the system with Hollister's manufacturing processes.

"In all cases, you don't get a perfect match," he said. "You either have to modify the package or plant procedures every time."

Even though the firm will not have terminals for the system installed until late in the year, end users have been deeply involved with the development of the system in order to ensure comfort with it, he said.

MVS
EDUCATION*

MVS INTERNAL LOGIC,
SYSTEM DESIGN AND PERFORMANCE
For Systems Programmers and Technical Management

Tampa, Florida December 8-12, 1980
Hartford, Connecticut January 12-16, 1981
** Also available on 60 self study video modules.*

303X
EDUCATION

JES 3

COMPUTER AIDED INSTRUCTION

24 courses available under IBM's IIS system or CSR's micro-based TRAINER-3000™.

CSR

Computer Systems Research, Inc.
Write or call collect for registration and information on other live lecture/self study on site JES 3/MVS or 303X operations courses and computer aided instruction courses:
Mike Daversa, CSR
195 West Main Street
Avon, Connecticut 06001

(203) 678-1212

Strategies of Productivity Urged

(Continued from Page 25)

tralized to accommodate size and diversity. Perhaps more important, it is decentralized to foster career ambitions, he asserted. Such a structure leads to more "pseudo-top management" positions, according to Carroll.

He also noted the emergence of the "chief production officer." "Is this a sop or solution?" he asked rhetorically. "I worry about the hero approach to productivity. It smells of a nonsolution, and a nonstrategic one at that."

Taking a shot at such failed U.S. "dinosaurs" as Chrysler Corp., Lockheed Corp. and the Penn Central Railroad, he espoused a shift to international logistics. By bailing out the likes of those three, America is "pouring public and private money into the ditch," he claimed.

What is worse, such welfare may be harmful to other, stronger enterprises such as the semiconductor industry, he warned. "We have not been Japanese enough to realize some businesses aren't worth saving," he argued.

Legal Broadside

While on the subject of the fallen businesses, he also fired a broadside at the legal profession.

When Chrysler and Penn Central were at the "moment of crisis," he said, "they were led by lawyers."

Carroll cited IBM, Texas Instruments, Inc. and Caterpillar Tractor Co. as examples of companies with a dedication to productivity. Their success is attributable to people who think in productive terms and reward others who do likewise, he said.

The Hoover executive called for more public affairs programs as part of an effort to reunite industry and government, who have been adversaries in the past. Such an adversarial relationship can only be degenerative, he stated.

Carroll concluded with two comments. First, productivity affects nations with and without free market economies equally, he said.

Second, he noted that lasting solutions to productivity problems are only available to those who have the freedom to choose among strategic options.

MRP Viewed Economizing

(Continued from Page 26)

much emphasis on the computer angle of MRP. It merits a one on a scale of 10 in overall importance, he said. "Just because you run some software through a computer doesn't mean you're going to have success."

The other nine points on the 10-point scale are attributable to what Orlicky termed "the three pillars of MRP." They are educated users, master schedule and data integrity.

The educated user is everybody from the top manager to the stockroom clerk, he said. They must all be trained, compensated and qualified.

Most important, the master schedule must be "doable," he maintained. It must be intelligently managed and realistically reflect such factors as lead time and capacity planning.

If the master schedule is skewed, the MRP system becomes subject to an awful litany of disruptions, including excessive inventory, no capacity planning, an ineffective priority system and unpredictable surges in shipments.

Data Integrity

Data integrity includes the all-important bill of materials, inventory data and other file data. "MRP is totally dependent on the bill of materials," Orlicky said.

Orlicky repeatedly blamed management for the high rate of MRP failures. "If we are to have law and order in the manufacturing process, people must give up their ways and practices, and management must be at the head of the charge.

"I guess managers don't understand that, and that's why most of them who have put in MRP systems have failed."

Japanese Example Cited

U.S. Warned of 'Technology Trap' in Robotics

By Bruce Hoard
CW Staff

CHICAGO — Japan's burgeoning robot population could lead that country into a "technology trap," according to Bruce Haupt, director of Advanced Manufacturing Systems for IBM. Haupt made his remarks at the Info/MFG conference and exhibition held here recently.

"People tend to use new technologies the same ways they used the old ones," he said. In the case of humans and robots, that could lead to high-speed feeders and low-speed robots, he claimed.

Japanese robots also lack flexibility, he added. This inability to adapt to new modes of operation could be costly when it comes time to retool. U.S. robot manufacturers can avoid that pitfall by using "passive" tooling on robot-aided assembly lines.

Passive Tooling

Passive tooling eschews the use of motors and springs in favor of gravity, a far less expensive feeding device, he explained.

Haupt also urged U.S. manufacturers to disregard traditional return on investment wisdom when considering the economics of robotics.

"The problem today is people justify equipment on a two-year payback," he said. "But the rules are changing. The short-term payback is intimidating, and it's going to change because the Japanese did it."

A change in U.S. government policy toward robotics will fuel that change, he claimed. "Finally, the political pressure in the country is turning in support of the industry. But up to now, the U.S. government has been terrible compared to the Japanese," he charged.

Japan spent $100 million on robotics development between 1973 and 1978, 63 Japanese universities are working on robot research and 130 Japanese companies manufacture robots currently, Haupt said. All that adds up to twice as many robots in Japan than in the U.S.

There are some bright spots on the home front, however. The 35% yearly industry growth rate has pushed two previously divergent institutions into bed together — academia and government. "I think that's great," the director said.

Dr. Angel Jordan, dean of Carnegie Mellon University's robot institute spoke of the role of robots in the "factory of the future." Like Haupt, he cited the big lead Japan enjoys in robotics development.

"Japan is rapidly developing self-contained factories to be sold to developing nations," he declared. Such a factory is at least 10 years away, he added.

And before completely automated factories become reality, today's robots are going to have to undergo some major improvements. Most robots are not "intelligent," lack perceptual capabilities and are too slow and heavy, the dean noted.

3-D Vision

Perhaps the most difficult perceptual trait to achieve is three-dimensional vision, Jordan said. When breakthroughs are made in that area, robots will be able to perform such tasks as picking small objects from bins, a major breakthrough on the shop floor.

Such technological advances will be good for both employer and employee, he claimed. "Automation will free the workers for something more interesting and challenging."

On a broader scale, the entire manufacturing process will fall into the hands of what the dean described as "intelligent manufacturing systems (IMS)." IMS will provide instantaneous assessment of all manufacturing processes to all relevant and concerned parties, he predicted.

In the case of a breakdown, the shop foreman, maintenance personnel and even salespeople will be notified of the problem and its likely ramifications. However, failures will be uncommon because "no resource will be critical" and thus capable of bringing down the entire system, he said.

IMS will also use artificial intelligence to perform organizational modeling. Models will represent processes, machine tools, materials, people, departments and data bases, Jordan stated.

Organizational management and analysis are two other areas that will fall within IMS's bailiwick. Scheduling, a complex bane to many manufacturers, will be taken over by the system.

"Current approaches to scheduling are either manual or subject to an inflexible computer-based system," the dean noted.

Organizational analysis is now performed with simulation models that take three weeks to six months to build. IMS will have a complete profile of the organization available at all times, he said.

Every user, from managers to shop floor workers, will have terminals and be in communication with machines throughout the system, he added.

Tool Maker's Mini Guides Firm To $25 Million Revenue Hike

PHOENIX — A small machine tool manufacturing plant here has improved productivity while increasing its work force since it added a microprocessor to its manufacturing apparatus.

Six years ago, Bayer Industries, Inc. — which makes machine tools for the aircraft industry — had fewer than 12 employees and 12,500 sq ft of plant space. By 1980, the firm's employees had grown in number to 140, and the space had increased to more than 60,000 sq ft, according to Carl Riordan, the company's marketing manager.

As for revenues, Bayer went from being "practically broke, with the boss mortgaging his house to make the payroll" to $25 million in gross revenues, he noted.

In addition, the firm grew from manufacturing four machines a year to more than 30 each month, Riordan added. Contributing to such growth and success was the addition of a microprocessor to its manufacturing apparatus, a change that eliminated the need for machine toolers at every step of the process, Riordan explained.

"With the microprocessor taking over some tooling functions, all we needed were people who could pull a lever," he noted. "We hired 35 or 40 guys off the street and trained them."

The resulting shift in skilled and unskilled workers left some gaps in the machinists' expertise, however, since it was then necessary for them to communicate with machines instead of run them. The solution? "We teach the toolers to program instead of teaching programmers to become machinists," Riordan explained.

Bayer's "high-speed programmable machining center," called Acroloc, which it sells to users around the country, and on which it fashions parts for the machine itself, is now essentially run by computerized numerical controllers.

The unit's microprocessors are supplied by McDonnell-Douglas Automation Co. of Monrovia, Calif., which makes the Actrion III, and General Numerics Corp. of Oak Grove, Ill., which sells a 6M-byte microprocessor with a bubble memory.

"We have two suppliers so we won't get in a bind in terms of availability, and we'll sell machines with either one," Riordan said. "The customer knows which one he's getting, but they're really interchangeable."

Fips 70 to Aid Data Exchange

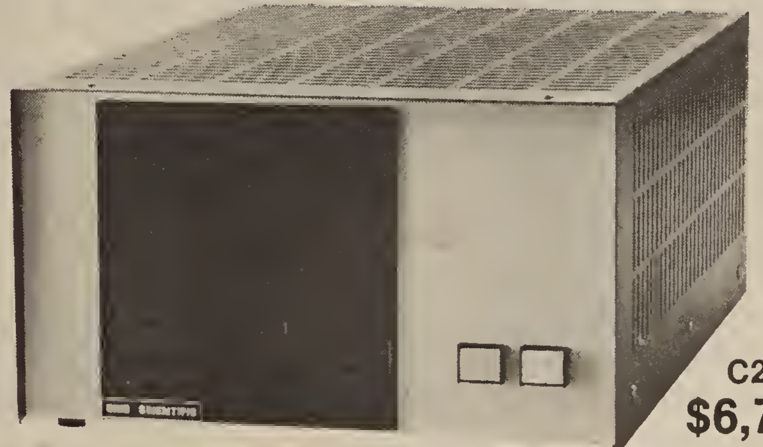
WASHINGTON, D.C. — A new standard to help improve the interchanges of geographic point location data in federal automated systems has been approved by Secretary of Commerce Philip Klutznick. The standard is of particular interest to mapmakers, geologists and other users of precise geographic information.

The new Federal Information Processing Standard (Fips 70) becomes effective April 24. It is based on American National Standard X3.61-1978, a voluntary industry standard of the same name — "Representation of Geographic Point Locations for Information Interchange" — developed by the American National Standards Institute.

In short, it provides a uniform means for information representation in digital form, facilitating exchange among information systems.

Print and microfiche copies of the standard will be available from the National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Road, Springfield, Va. 22162.

A new small
10 Megabyte System
from the leader in
Winchester based
microcomputers.



C2-D
$6,795

Ohio Scientific has put a new, low-cost, high-performance 8" non-removable hard disk together with its popular desk-top microcomputer system. This yields approximately 10 megabytes of fast hard disk capability at a tremendous cost/performance benefit over floppy based microcomputer systems.

Standard Features
- 52K RAM
- 8" floppy disk drive for program transport and backup.
- OS-65U small business operating system.
- 9-digit prescision BASIC by Microsoft.
- Available in OEM quantities at attractive discounts.

For literature and the name of your local dealer, CALL 1-800-321-6850 TOLL FREE.

OHIO SCIENTIFIC
1333 SOUTH CHILLICOTHE ROAD
AURORA, OH 44202 • (216) 831-5600

FAA Drafts Plan in Case of Controller Strike

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Aviation Administration (FAA) has issued a draft contingency plan that would drastically limit airline service if a rumored strike of the nation's air traffic controllers (ATC) takes place next spring [CW, Oct. 13].

ATCs are civil service employees that guide air traffic using computer-based tracking equipment.

Seeking comments on the proposed plan by Dec. 15, FAA Administrator Langhorne Bond was quoted recently in the *Washington Post* as saying, "I believe a strike will happen."

Bond also reportedly charged that the Professional Air Traffic Controllers Organization (Patco) "is planning a nationwide strike that closes everything." While Patco's present contract expires next March 15, Patco members around the country consistently deny that a strike is planned.

Such denials belie the "frustration, anger and resentment . . . across the country" privately expressed by controllers toward FAA management. One of the sources of such frustration is what controllers have long regarded as the outmoded and unreliable ATC computer equipment.

Other traditional sources of discontent include alleged undercompensation, understaffing and training programs that strain the limitations of journeymen controllers.

Lending credence to the FAA's intuition is the fact that, last April, Patco issued to its members an "educational" document — numbering more than 100 pages — describing actions to be taken in the event of a strike. According to Patco Executive Vice-President Robert Meyer, the document will be used only in the event that Congress should change the existing law barring civil servants from striking.

The FAA, however, calls the sheaf "a detailed strike plan." In addition, the FAA regards Patco's $2 million "subsistence fund" — allegedly for use if Patco gets the right to strike — as an outright "strike fund."

Cutback to 15%

If the FAA's guess is correct, and Patco's 15,000 members — 85% of the U.S. controller workforce — go out on strike next March, the agency estimates air service would operate at only 15% of normal strength and that only between 35% and 40% of the more than 12,000 scheduled daily flights could be handled by the remaining controllers.

In the event of such a strike, the agency plans to "maximize the number of aircraft that can be accommodated with the reduced work force," which would comprise supervisors, nonbargaining unit employees and nonparticipating controllers.

Such maximization would entail "the use of limited aircraft operations, rigid schedules, routes and altitudes and the reduction or elimination of some service not affecting the safety of the ATC system users," according to the FAA's "National Controller Strike Contingency Plan."

Specifically, in the event of a strike, most people who want to travel less than 500 miles will have to find alternative means of transportation, according to the plan.

The FAA will give top priority to essential military and medical emergency flights and secondary priority to scheduled airline flights of more than 500 miles. Only then would other flights be considered.

Auction Net Lets Ranchers Sell Cattle Via Terminals

By Deborah Wise
CW Staff

COLLEGE STATION, Texas — Cattle auctions could go on without the animals, the corrals or the auction barns if ranchers used a computerized auction system recently developed.

Instead of traveling many miles to an auction and risking the physical well-being of his cattle, a rancher can put his herd up for sale using a communications network devised by two systems analysts at Texas A&M University here. The network allows buyers and sellers to complete transactions without leaving their CRT terminals.

"If you have cattle to sell, you contact an auction market that then sends out a grader to classify the cattle by age, size, breed and weight," Thomas S. Clifton Jr., one of the system's developers, explained.

This information is then stored in the Amdahl Corp. 470V/6 mainframe at Texas A&M's data processing center. The software for the system is based on IBM's IMS data base management system; Clifton and his colleague, Jeffrey C. McCabe, wrote the auction programs in Cobol.

Problem of Acceptance

At present, there are 16 IBM 3275 terminals in the field that communicate using leased telephone lines. Though the response from ranchers has been slow, "the system has only been in operation a couple of months," Clifton said. "I think the biggest problem is getting the people to accept it."

Cattle auctions are traditional and sometimes social events, and it is difficult to get farmers to suddenly change over to a system where they have to put absolute faith in an outside grader and may even be selling to someone they do not know, he said.

The system is only in operation for feeder cattle — that is, cattle to be sold to be fattened for slaughter — but may be expanded to include "fat" cattle, cattle sold directly for slaughter.

"We were interested in trying to come up with something for the breeder who deals in large volumes and something that increases the size of the market and the number of buyers," Clifton explained.

Both buyer and seller can be in contact from a distance of 100 miles or more without moving the cattle an inch before finalizing a transaction.

Bidding Process

The auctions follow the English rules whereby a predetermined time and date must be advertised. As many as eight lots at a time appear on the terminal screens along with detailed information as to breed, average weight and age.

Buyers then have a chance to bid during a 16-minute period. Both the highest bid and their bid are recorded on the screen simultaneously.

The terminals themselves are situated at auction barns and in central locations where more than one buyer or breeder can use the facilities. "On one day we had a lot that went for $100,000," Clifton said. And on another occasion, if the bids had passed the seller's reserved price, more than $350,000 worth of beef would have been sold.

At present no commercial concern has advanced plans to take over the project, which is being financed through a federal grant and by Texas A&M.

Proceedings of ICCP To Be Published Soon

CHICAGO — The edited papers and proceedings from the recent Institute for Certification of Computer Professionals (ICCP) conference will be made available by early next year.

At the conference, 30 international experts discussed the definition of systems analysis and design and the needs and criteria of certification.

More information is available from the ICCP at 35 E. Wacker Drive, Chicago, Ill. 60601.

OBS WYLBUR® = INCREASED PRODUCTIVITY

FOUR PACKAGES IN ONE TO DECREASE DEVELOPMENT AND TEST TURNAROUND TIME:

- On-line program development
- On-line production job scheduling
- Document formatting
- Interactive word processing

PRICED 30-50% BELOW COMPETITIVE SYSTEMS, **WYLBUR**® HELPS YOU ATTRACT AND KEEP THE BEST PROGRAMMING TALENT. CONSIDER THESE FEATURES:

- Fast and flexible full screen cursor editing
- Job submit, control and output retrieval
- Dataset maintenance
- Interactive command language
- One- to three-second response time
- A forgiving syntax
- VTAM support
- Low resource consumption

FOR MORE INFORMATION OR A FREE TRIAL CALL
(415) 391-9555

WYLBUR is a trademark of Stanford University

ON-LINE BUSINESS SYSTEMS, INC.
115 Sansome Street, San Francisco, California 94104

$$\left[(P+D+Q)+(G^5+G^1+G^\infty)\right]$$

= THE SOLUTION TO YOUR COMPUTER POWER PROBLEMS

To solve the equation, look to Computer Power Products, a Division of Sweinhart Electric Co., Inc. We've been solving power problems since 1928! That adds up to 52 years!

Introducing the world's leader in Computer Power Conditioning, utilizing advanced integrated control logic to provide the highest quality, most reliable system ever manufactured at an unbelievable price competitive with other less effective protection devices. An **energy efficient** synchronous motor-generator system, 18 to 219 KVA, with an optional digital readout system and System Status Panel which provides a central location for essential readout information . . . for the status of the computer system's power and the facility's safety systems. Available in load isolation and frequency changer models to meet any domestic or foreign frequency and voltage.

Outstanding Features: • A 5-year limited warranty on motor-generator windings (an industry first). • Optional digital status panel (an industry first). • Money-back performance guarantee (an industry first). • 6 to 8 weeks delivery. • Lowest cost per KVA in the industry.

And . . . all **Computer Power Products** motor-generator systems are PREWIRED, tested and certified at the factory to facilitate installation . . . just as simple as installing a transformer!

If you have a computer power equation you need solved, look to the experts! Call or write Richard N. Bowyer.

S E C

COMPUTER POWER PRODUCTS TELEX: 6-74416
2900 East Olympic Boulevard, Los Angeles, Ca. 90023 • (213) 264-1521

Amid Growing Decentralization

Optimism Voiced for 'Trusted' Future Systems

By Jake Kirchner
CW Washington Bureau

GAITHERSBURG, Md. — With the growing trend toward decentralization — allowing more and more people access to computing power — the need for secure systems architecture becomes more urgent. Fortunately, the prospect for commerical availability of such systems is auspicious, according to participants at a recent seminar here.

I'm really encouraged by the efforts coming out of the manufacturers," said leadoff speaker Stephen Walker, chairman of the Defense Department Computer Security Technical Consortium.

The seminar, the third in a series sponsored by the DOD Computer Security Initiative Program, brought together a mix of users and vendor representatives who presented an optimistic outlook for development of "trusted" computer systems.

'Trusted' Definition

A trusted system is defined as one that employs sufficient hardware and software integrity measures to allow simultaneous processing at multiple levels of security.

The Defense Department, which has carried on its own struggle to develop trusted systems, has been trying to get the word to manufacturers that there is a growing need for multilevel computer security in both government and private sectors. The vendor community has reponded well, according to Walker.

The task "is being pursued very aggressively," he said. "Soon we may not have to be able to build the ultimate [secure] system ourselves: we may well be able to buy it from the manufacturers."

Walker said he recognizes the constraints on manufacturers — the need to develop "a ready and easy way to transition the existing customer base" to secure operating systems — but said he sees "evolutionary" progress toward that goal.

To keep abreast of this progress, he said, the government will establish within a year, perhaps in DOD or with the cooperation of the Commerce Department, a computer security technical evaluation center. A prime function of the center will be to set hardware and software security criteria and to evaluate industry and government developed systems against those criteria.

From the seminar presentations of several vendors, it seems the center will soon have a number of products to evaluate.

Honeywell, Inc., whose work in this area goes back to the '60s and its primary role in developing the multiple access time sharing system, Multics, is "committed to aggressive action" in providing economical trusted systems, Irma Wyman, Honeywell director of corporate information services, said.

Using the security kernel approach, Honeywell is developing a "spectrum" of computer systems to reduce the security risk to a level acceptable to individual product markers, military and civilian, she said.

Also represented were Mitre Corp. and Systems Development Corp. (SDC), which have done considerable work in developing trusted operating systems using security kernels — hardware and software mechanisms that, when incorporated in systems, control access of individual user to specified information and processing functions.

Tymshare, Inc., which, like SDC, is developing a trusted operating system for IBM 370 architecture, was represented by Jay Jonekait, manager of advanced systems development, who reported on Tymshare's Gnosis 370 operating system.

Rounding out discussions by Univac and Digital Equipment Corp. executives of their firms' security research efforts, Viktors Bertis of the IBM systems architecture group, described the security features of the IBM System/38, whose design, DOD's Walker predicted, will be "widespread" in upcoming IBM systems.

The System/38, with its log-on procedures for each user, incorporates a matrix of user profiles and resident data objects that determines user access to information and operations.

The noncomputer center, nonprogrammer environment — for which the small business computer System/38 was designed — typifies, Walker said, the kind of future computing environments that will necessitate more widespread use of trusted systems.

Technology to 'Populate The World With Terminals'

By Rita Shoor
CW Staff

OAK BROOK, Ill. — The number of people in an organization that interact with computer systems will increase from today's 2% to between 50% and 70% by the end of the decade, according to Serge Beauregard, Deltak, Inc.'s group vice-president for literary services and products.

"That includes word processing systems that communicate with DP systems, " he said. Technology is moving to "eventually populate the world with terminals," he said in a recent interview here.

Within 10 to 15 years, "no one will be working at keyboards any more," he continued, because of technological advances in voice recognition gear.

What does all this mean to the people whose jobs will become obsolete?

On a macroeconomic level, the trend means "a large population in the work force will have to be redeployed," according to Beauregard. In microeconomic terms, it is probable that companies that traditionally allowed attrition to take care of those employees with jobs that are being phased out will be faced with extensive retraining and reemployment problems.

The movement to distribute technology to its users has been going on since the beginning of this century, according to Beauregard. Most jobs in today's business world did not exist in 1900, he said.

The DP industry is following the same pattern by its increasing effort to put information technology into the hands of the system users, he noted.

Future plans for Deltak — a firm that specializes in training and education tied to DP technologies — include the development of programs that will enlarge the technical vocabularies of the leaders within an organization and make them aware of the rate of change within the DP industry.

Johns Hopkins Announces Contest To Aid Handicapped Programmers

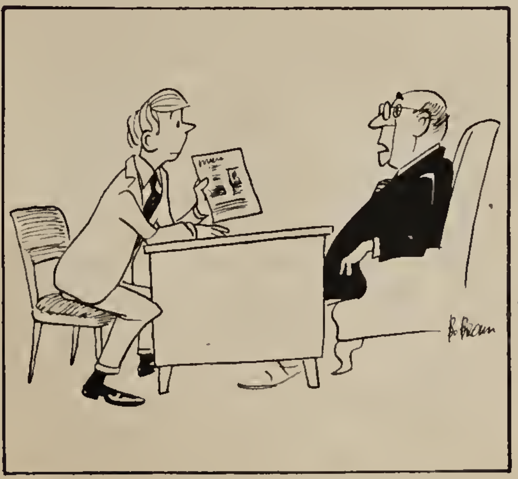
LAUREL,- Md. — Johns Hopkins University announced a nationwide search and contest aimed at uncovering new applications of personal computing for the handicapped.

Funded by the National Science Foundation and Radio Shack, the contest began last week and will run until June 1981. The university is offering a $10,000 grand prize for the device, system or computer program that best fits the needs of the handicapped. In addition, 100 other awards, including 15 personal computer systems, will be presented for winning submissions, a spokeswoman said.

The contest is open to computer professionals, amateurs and students throughout the U.S., with awards in each category. Submissions can include Computer-based aids for the blind, deaf or mentally retarded; ideas for applications that help individuals with learning disabilities; and devices for the orthopedically handicapped.

As part of the contest, special meetings on computing for the handicapped will be held at rehabilitation centers and technical conferences across the country early in 1981

Additional details on the contest can be obtained from Johns Hopkins University, Personal Computing for the Handicapped, P.O. Box 670, Laurel, Md. 20810.



'You Understand, of Course, That We Are Interested in a Computer That Will Eliminate Only Those Workers in the Lower Echelon.'

why would a busy
data processing professional
go to graduate school
on saturday?

To be better prepared for the challenges that come on Monday

Fairleigh Dickinson University announces a weekend program leading to an MBA in Management (For Data Processing Professionals) On the weekend, when the business world slows down, an innovative graduate business administration program revs up at Fairleigh Dickinson University in Rutherford, New Jersey The program, open exclusively to experienced and academically qualified data processing professionals, leads to an MBA degree in two years of study on Saturdays

Data processing professionals with at least five years' experience in the field, take courses in five-week modules. They progress through the program in a single group, beginning in September or February, completing three modular courses each semester

For an application and more information, mail the coupon today Or phone the College of Business Administration, Rutherford Campus, at (201) 933-5000, Ext 210

University Admissions
Fairleigh Dickinson University
155 Montross Avenue
Rutherford N J 07070

Please send me an application and more information about the MBA in Management (For Data Processing Professionals)

NAME ____________________
ADDRESS ____________________
CITY ____________ STATE ________ ZIP ________
BUSINESS PHONE ____________________
area code
HOME PHONE ____________________
CW 12-1

No person acting within the scope of his or her authority and responsibility at Fairleigh Dickinson University shall discriminate on the basis of race; color; creed; sex; national origin; handicap; military status; or age, except to the extent permitted by law.

fairleigh dickinson university
Florham-Madison, Rutherford/Wayne Teaneck Hackensack, New Jersey

GE Technique Finds Faults, Helps Restore Power Fast

SCHENECTADY, N.Y. — A computer-based power distribution monitoring and control system developed at General Electric Co.'s (GE) research and development center here could help restore electricity immediately to all but the locations directly affected by a fault.

The new technique, called Probe, will be able to locate a power fault in a miles-long power distribution network and reconfigure the network to restore electricity to all but the households in the immediate vicinity of the fault, according to a GE spokesman.

The concept was tested at a Commonwealth Edison substation near Chicago and was very successful, according to Dr. Arthur C.M. Chen, manager of GE's Electrical Systems and Technology Laboratory.

Based on the test results, the Electric Power Research Institute (Epri), a nonprofit organization involved in research programs for the utilities industry, has awarded GE a $3.5 million contract to "commercialize" Probe. Epri has rights to the patents of any discoveries.

The tested prototype system consisted of two Univac V77 minicomputers, Intel Corp. 8080 microcomputer-based monitoring and control units and a communications network that used either radio transmitters or specially allocated frequency or power lines.

Ideally, the system should work as follows: The micro-based monitoring units are installed on utility poles. In the event of a fault, sensing devices at the substation send warning signals to a substation computer which determines the location of the fault using specially designed software.

The minicomputer "interrogates" the units on the utility poles to establish whether the fault is transient. If it is permanent, the computer will reconfigure the network to reestablish power to unaffected sections and then alert a service team.

When the system is in operation, Chen predicted, about five to 50 pole units would serve a single substation, depending on the area.

Further research is being done at GE's Digital Systems Operation in King of Prussia, Pa., and Chen said GE may be taking orders by 1984. A full-scale test will be put into operation by 1982 at the Texas Electric Service Co.

Chen anticipated problems in the communications aspect of the system. During the Chicago test no actual power failure occurred, though results from simulated conditions were favorable.

With about 40,000 distribution substations nationwide, it would require more than 25 years before the system could be adopted nationwide, Chen estimated.

Probe could be used nationwide because most utility companies, with the exception of those in a few large cities, work on the same principles for power distribution.

Robert M. Hardy, a member of the Probe development team from the GE Research and Development Center, examines a microcomputer circuit board that serves as the "brains" of an experimental remote unit that is designed to open or close a pole-top switch on command from the Probe system's central computer. This unit is part of an experimental Probe system that was installed for evaluation in the Commonwealth Edison service area outside Chicago.

DBMS Lets Dairy Bottle Up Order Problems

SAN ANTONIO, Texas — "Unlike most businesses, which match production to market supply and demand, milk producers must work with the schedules nature has given them," noted Bob Seymour, data processing manager of Associated Milk Producers, Inc. (Ampi) here.

By installing a data base management system (DBMS), Ampi, the nation's largest nonprofit cooperative dairy in terms of revenues, has improved the coordination of its processing plants that convert surplus milk to other marketable products.

"We were looking for an immediate solution to our cheese packaging bottlenecks," Seymour explained. "Cheese has a relatively short shelf life, so we must key production to fit the day-to-day demand.

"Once the cheese is packaged and ready to ship, the price has to be figured. The price of cheese — and all dairy products — fluctuates constantly, and manual calculation for each order can cause headaches and costly delays. All orders have to be out within seven days of receipt," he noted.

In selecting a specific data base management product, the dairy looked for the ability to get applications up and running quickly, the advantages of multiple entry points, an end-user-oriented language, a competent report facility and marginal use of computer resources.

Tree Index

Intel Corp.'s System 2000/80's inverted tree index and straightforward programming language were endorsed by the dairy's programmers, and the flexible on-line capabilities were exactly what was needed for completely computer-naive end users in a manufacturing environment, Seymour said.

After installing the DBMS on an IBM 370/158 with an MVS operating system, the DP department began to implement what is now called the on-line order entry application, focused at this stage on cheese packaging.

The dairy's main cheese packaging plant is located in Portage, Wisc. Cheese orders come in to one of the regional offices and must be logged on the CPU here before proceeding to Portage.

Prior to acquiring the System 2000/-80 DBMS, Ampi employed telex [TWX] facilities to relay orders from the regional office to Portage. In addition to the time delays, there was always the probability of human error and equipment malfunction. "It was clear we were heading into the space age of data processing with dark ages equipment," Seymour recalled.

Now, clerks in the cheese factory — who know nothing about computers or data base management — utilize the DBMS through customized on-line systems and string commands to communicate with regional office personnel.

Calculating Prices

Another area where the DBMS helps tremendously, Seymour said, is price calculation. Dairy products are priced by independent exchanges, similar to the stock exchange. Their pricing fluctuates at least weekly, in response to bidding from the exchange floor.

"The DBMS completely automates the procedure, plugging the weekly market figures and the date into a formula and instantly producing current price. It has really helped to speed the process along," he said.

System 2000/80 handles more than 2,000 orders per month on the cheese application alone, and data processing personnel are looking to the day when similar applications will be up and running for fluid milk, butter and other manufactured dairy products.

Five additional data bases — accounts payable, personnel, general ledger, fixed assets and a billing system for fluid milk — are already loaded and ready to go into production.

These will help to lift the managerial burden that has increased with the complexity of Ampi's operations, Seymour noted.

VAX® & PACS™
...team up to solve your problem of Resource Management and Chargeback.

Signal Technology's Process Accounting and Chargeback System (PACS):

- Satisfies in-house, commercial and government contract audit requirements.
- Reports use of all system resources to help optimize configuration and chargeback rates.
- Reports current charges to users on-line.
- NEW! Software packages and non-standard devices can now be accounted ... plus many other features...

*VAX is a registered trademark of Digital Equipment Corporation

For further information, contact
SIGNAL TECHNOLOGY, INC.
15 WEST DE LA GUERRA • SANTA BARBARA, CA 93101 • (805) 963-1552

Twin Nuns Pool Efforts To Establish Micro Lab

Sisters Marilyn (left) and Carolyn build a micro.

By Deborah Wise
CW Staff

S. ORANGE, N.J. — "Microcomputers are really beginning to come of age — but it is happening so rapidly. Three years ago, we didn't have any microcomputers at all."

Such comments are usually made by the manager of a small business. This time, however, they were made by an Ursuline nun, Sister Carolyn Therese Welter, who, with her identical twin sister, Sister Marilyn Therese, is setting up a microcomputer laboratory at Seton Hall University here.

"We're trailblazers in a way," Sister Marilyn said. "Many colleges do not have a computer laboratory as such, just computers in different departments or off in some closet. What we do is bring the computers together in a central location."

The two sisters have been organizing the laboratory since September. It has Heath Co. H89, Radio Shack Model II, Level II and Radio Shack Model I, Level II microcomputers.

The center is located in the Business School at Seton Hall. "This is an excellent idea because computers and micros in particular are used most in business," Sister Carolyn said.

The center will be used primarily by students who will be given hands-on experience with the micros. However, it will also be available for use by the rest of the faculty and by the university's administration.

"We are not entirely up and running," Sister Carolyn said, adding that the center could do with more equipment. "We really don't have the systems we need, like disk drives and printers."

At one time, the twins did some consulting work for friends. They are considering going back into the consulting business to make the extra money they need to buy more equipment for the laboratory.

Identical Careers

Combining the religious with the secular, the two sisters have followed identical careers. Both joined the Ursuline order 27 years ago, both majored in mathematics at the same college and both received master's degrees in computer science from the University of Maine. They are now doctoral candidates at the University of Toledo; however, they have undertaken different thesis topics.

Sister Carolyn is researching ways to alleviate the anxiety that administrators and faculty members feel when computers are introduced into their working environments. She believes one way of easing this situation is developing easy-to-use software packages for microcomputers specifically designed for the noncomputer science-oriented person.

Program Gives Career Guidance

CLEVELAND — Cleveland State University (CSU) is using a computerized career guidance program to give students an overview of the regional and national job market and their potential to find work within it.

The program, called Discover, allows the students to sit down and work at their own speed and on their own without hesitation. "We have found that some students are reluctant to go to a counselor," Robert Moore, director of computer services at CSU, said.

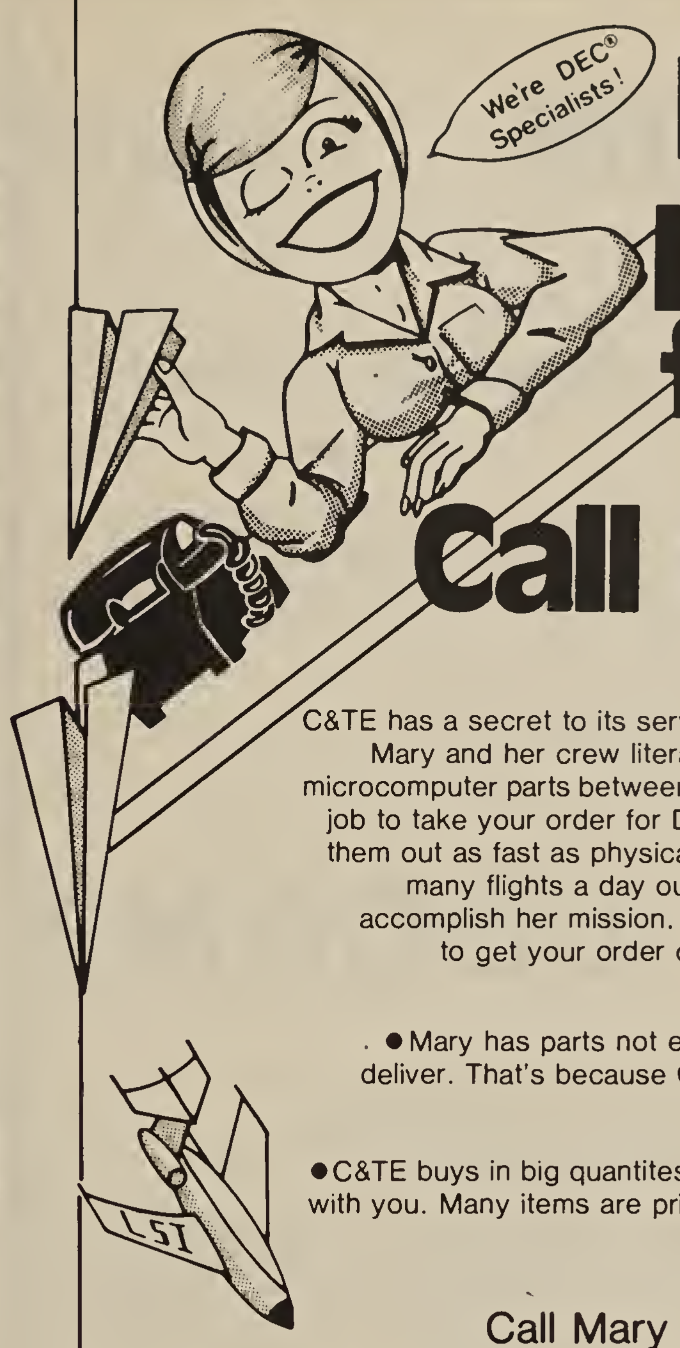
According to Moore, the response has been favorable. "But let me stress that the computer is not making the decisions. It lets the student find out more information about his values and goals and he can make the choices himself. It augments our counselors and is not used with a view to replacing them," he added.

The program, written in Cobol, runs on IBM mainframes and 3270-type terminals. It was developed by the Discover Foundation, a nonprofit organization headquartered in Maryland, and IBM has an exclusive marketing agreement. There are two versions available, one for secondary school children and one for college students and adults contemplating midlife career changes.

"The biggest advantage of the system is that it was built to be modified easily by non-DP people," according to Larry Blasch, education and industry consultant for IBM. This means that users can add regional information to the national data base to enhance the counseling potential of the system.

Moore said CSU has added a program that reflects the job market of the Cleveland district and Ohio area.

Discover costs $1,000/mo for two years. After this time, a user has a lifetime license. There is a 10% reduction for educational institutions and the annual updates cost $1,000.



Need parts fast?

Call Mary

C&TE has a secret to its service. It's Mary Caughman. Mary and her crew literally wait for you to call for microcomputer parts between 8-5 Central Time. It's her job to take your order for DEC® system parts and get them out as fast as physically possible. And she has many flights a day out of Pensacola, Florida to accomplish her mission. You can depend on Mary to get your order on the first flight available. Give her a try.

- Mary has parts not even the manufacturer can deliver. That's because C&TE carries an inventory you'd envy.
- C&TE buys in big quantites and shares the discounts with you. Many items are priced under manufacturer's list. So don't call them,

Call Mary (904) 434-1022

COMPUTER & TERMINAL EXCHANGE 114 E Gregory Street, Pensacola, FL 32501

S-560
• Intelligent Forms Data Storage System
• Multiple Communication Ports
TOP OF THE LINE
V-203A+
• Operator-oriented Video Display Terminal
• Upper/lower Case Characters with below the line descenders
T-300
• 7x7 Dot Matrix Printer
• 30 CPS, Up to 6 copies
T-382
• Table Top 9x7 Dot Matrix Quiet Printer
• 80 CPS, Bi-directional with Compressed Printing
T-1220
• Buffered 7x7 dot matrix printer
• 180 CPS, Bi directional
T-450
• Letter Perfect Printer
• 45 CPS, Bi-directional
V-203/1
• Two Full Pages Video Display Terminal
• Micro Processor controlled with special function keys
T-320
• Table Top 9x7 Dot Matrix Printer
• 30 CPS, Compressed Printing
V-100
• High Performance Video Display Terminal
• Detachable Keyboard with up to 132 Character Lines

THE BOTTOM LINE

ALANTHUS SERVICE NETWORK — Computer-based national service center with over 150 highly trained field engineers assures prompt and effective, unparalleled service capabilities.

STATE OF THE ART COMMUNICATIONS TERMINALS — Only highly reliable time proven terminals are offered for customer's standard and custom applications.

FLEXIBLE FINANCIAL PLANS — Customers can select various financial plans to meet their continuing needs without the constraints of product obsolescence.

alanthus data communications

6011 Executive Boulevard Rockville, Maryland 20852 • Telephone: 301-770-1150

LOCOM WHO?

Innovator of add-in memory

- IBM 158, 168 & 303X systems
- 64K MOS memory technology similar to IBM 4300
- Successful installations

WHY LOCOM?

- Superior reliability
- Space saving
- Less energy
- Ease of installation
- Lower cost

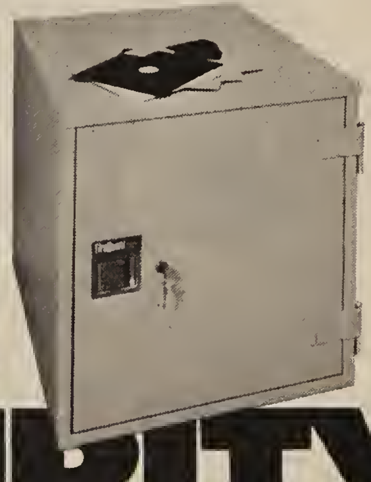
LOCOM CORP., SANTA CLARA, CA. 408-496-6511

New FireGuard Diskette Safe. The survival of your job and business can depend on the safety you provide vital business records. When your vital records are lost in a fire, no amount of insurance will replace them. Odds are 3 to 1 your business will suffer a staggering—if not fatal—setback.

The new FireGuard Diskette Safe is full-time, on-site fire protection for your company's most important asset... its vital records. If you are using any diskette based system, or using diskettes for back-up of critical data, you should know more about FireGuard's low cost solution to vital records security.

FireGuard bears a Class 125-1 hour label for fire endurance. Protection ability is independently certified to keep internal temperature and humidity safe for diskettes, other EDP media, and microforms.

Why place your job and business in jeopardy when you can have peace of mind knowing your vital business records will survive a devastating fire. See your nearest Schwab insulated products dealer today or contact us direct for detailed literature.



JOB SECURITY.

☐ Please RUSH detailed information about the FireGuard® Diskette Safe by return mail.

Name .... Title ....
Company ....
Address ....
City .... State .... Zip ....

Schwab Safe Co., Inc., 3000 Main St., Dept. MA
Lafayette, IN 47903, Tel. 800+428-7678, Ex. 77
In Indiana, phone 800+382-7532

Development Method Eases Documentation, Estimates During Project Life Cycle

PITTSBURGH, Pa. — System documentation and time and cost estimates are usually top contenders for "least favorite" assignment during a project's life cycle. Transcomm Data Systems, Inc. has made these tasks less formidable by implementing a formal system development methodology.

The software development firm has specialized in developing, installing and supporting distribution control and financial information systems since 1972. Its products are based on an on-line accounting system, Tolas-II. They include order entry, inventory management, purchase order management and sales analysis applications as well as modules for accounts payable and receivable, financial reporting, payroll and fixed assets.

Like many other installations, Transcomm initially opted for creating an in-house methodology for developing and maintaining computer software applications. However, the decision was made to go with Atlantic Software, Inc.'s SDM/70 when "manpower costs became prohibitive on the [in-house] project," a spokesman noted.

Tailored Needs

A full-time senior analyst was assigned the six-month job of coordinating training and implementation of the complete methodology. One of the reasons for the lead-in time was that the series of manuals had to be tailored to meet Transcomm's specific requirements, according to Richard Burns, senior systems analyst. SDM/70 is primarily targeted toward end-user installations rather than at software development houses.

Personnel from Atlantic Software, Inc., the SDM/70 vendor, were available for both training and consultation as necessary, Burns noted.

"We began the process by using it on a small project. The SDM/70 estimating guidelines produced amazingly accurate final-cost figures. That initial demonstration of success prompted an enthusiastic, receptive response from the analysts, programmers and technical writers," he said.

SDM/70 is a phased approach to developing and maintaining computer software applications. Its key feature is the process of segmenting all projects into clearly defined phases. Each phase ends with the development of describing the work of that phase for both the vendor and the client. Succeeding phases are based on the work of previous phases as represented by their end documents.

"SDM/70 has helped us most at the requirements-definition phase of every project by focusing our attention more rigorously at this design level," Burns noted. "The approach encouraged us to do a predetermined step-by-step analysis of a client's business requirements and compare those requirements with our standard software."

The net effect is to isolate design problems in the planning stage rather than in the installation stage of the project, according to Transcomm.

The improved documentation, attributed to SDM/70, is also improving communications between clients and the firm's technical staff, a spokesman said. By providing a detailed base of knowledge common to both parties, full SDM/70 documentation supposedly makes for easier problem solutions.

A systems design objective, systems external specification, user guide, procedural guide and systems guide using SDM/70 guidelines are provided for each system. "This documentation supports our systems in many instances where people would have once fielded the question," noted Richard D. Sikon, manager of product development.

Lastly, the SDM/70 technique has been helpful in predicting software development costs by using the phased approach to estimating instead of blanket quotations, the firm said. Each software development project is broken down into several discrete segments. Estimates, using SDM/70 guidelines, are made segment by segment and acknowledged by both the client and Transcomm in the same way. Both have a clear idea of the cost of work in progress and a more reliable estimate of the total cost of the entire project.

This phased approach substantially reduces the likelihood of unmanageable and unexpected cost overruns on software projects, according to the company.

There are six projects currently underway at Transcomm, and SDM/70 is being used on all of them, Burns said. The methodology played a "vital role" in organizing an assignment for a Cincinnati-based client, Mead Merchants. This paper distributor required the completion of a large order processing and inventory control system by 1981.

Through SDM/70, "we are progressing on schedule, within budget, in developing the appropriate enhancement documents to tailor our standard packages to Mead's needs," Burns claimed.

The full implementation of SDM/70 has resulted in "better designed and better documented" software, Transcomm President Alex Burstein maintained. And — no small consideration — it has allowed the firm to price its wares more accurately.

MVS Course to Focus On Design, Structure

AVON, Conn. — To provide MVS users with practical knowledge of the design and structure of MVS, Computer Systems Research, Inc. will be conducting a five-day in-depth program on MVS internal logic, system design and performance. The two upcoming options are Dec. 8-12 in Tampa, Fla., and Jan. 12-16, 1981, in Hartford, Conn.

Topics that will be covered include supervisor services, IOS, storage management, virtual I/O, catalog management, design of IPS and various MVS performance considerations.

Further details are available from course sponsors at 195 West Main St., P.O. Box 45, Avon, Conn. 06001.

THERE IS ONLY ONE 32-BIT COMPUTER WHOSE LOGIC DOESN'T DEFY LOGIC.

PRESENTING THE DATA GENERAL ECLIPSE MV/8000.

Apparently, our competitors are operating under the premise that there is no need to make their new computers compatible with their older ones. And have no qualms about rendering obsolete the years of man-hours and the hundreds of thousands of dollars you've invested in software.

At Data General, we believe this kind of logic defies logic. Which is why we designed our 32-bit MV/8000 to protect your software investment.

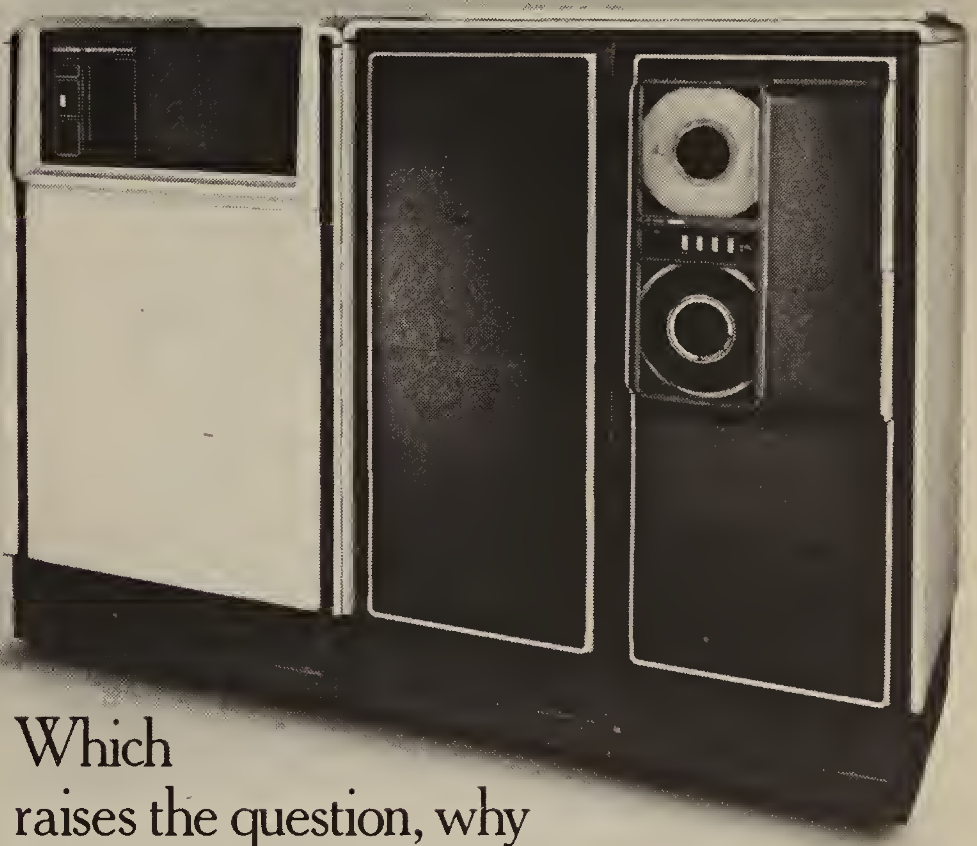
Not destroy it.

However, the MV/8000's software compatibility is only part of what places it in a class by itself. Another factor is speed. It's the fastest computer of its size on the market.

In fact, its 36.4 MB/sec memory bandwidth is at least two to four times faster than its nearest competitor.

It's also more reliable, much easier to maintain, quicker to get operational (it not only offers the widest range of software, but the widest range of languages*) and offers sophisticated security features, word processing, communications capabilities and data base management. All superior to its nearest competitor.

And while these features alone make the MV/8000 a most attractive investment, there's something else. It also costs less than its nearest competitor.



Which raises the question, why go to the nearest competitor?

If the logic of purchasing any other 32-bit computer escapes you as much as it escapes us, just fill out the coupon and we'll be happy to fill you in on the one computer that eclipses them all.

The remarkable new Data General Eclipse MV/8000.

Data General

Mail to: Data General Corporation
4400 Computer Drive, MS C228
Westboro, Massachusetts 01580

Attention: Marketing Communications Department

☐ Please send me more information on the Data General Eclipse MV/8000.

☐ Please have a sales representative call on me immediately.

Name________________________

CW-12-1-80

Title________________________

Company____________ Tel.____________

Address________________________

City________ State________ Zip________

*Fortran 77, Cobol, Basic, PL/I and RPG II

IBM Builds on Single Chip Fiber-Optical Receiver

IBM's Single-Chip Optical Receiver

YORKTOWN HEIGHTS, N.Y. — A researcher at IBM's Thomas J. Watson Research Center here has designed and built on a single silicon chip an experimental optical receiver that IBM said could lead to more economical use of fiber-optic data communication links between computing system devices.

The receiver is relatively inexpensive to fabricate and can operate at data rates high enough to take advantage of the information-carrying capacity of fiber-optic cables, according to an IBM spokesman. Much more information can be transmitted through such cables than through copper wire.

Besides higher data rates, smaller size and lighter weight, transmission through optical fibers provides immunity to electrical interferences and effects of the environment as well as security from unauthorized "tapping."

Possible Applications

One possible application of the receiver could be in the data channels that presently connect large central computers to peripheral equipment, such as storage and I/O devices; these channels currently use bulky copper cables. Another application could be in distributed data processing networks.

With a technique called current-mode amplification, used in an optical receiver for the first time, IBM researcher Dennis L. Rogers met the needs for both high bandwidth and low cost, the spokesman said. The data rate of the new receiver was reported to be 200M bit/sec, which is an improvement by more than a factor of 13 over commercially available, fully integrated optical receivers that produce logic outputs. The bandwidth is 180 MHz.

According to Rogers, the data rate appears extendable up to 1,000M bit/-sec with anticipated advances in silicon-chip technology.

Stratton Chair Created at MIT By Hewlett Gift

CAMBRIDGE, Mass. — An academic chair honoring Dr. Julius A. Stratton, 11th president of MIT and a leader in the development of research and education in American science and engineering, has been established at MIT through a gift from William R. Hewlett, chairman of the executive committee of Hewlett-Packard Co.

The Stratton Professorship of Electrical Engineering and Physics, recognizing Stratton's dual interest in these fields, will be occupied alternately by a faculty member from the Department of Electrical Engineering and Computer Science and the Department of Physics.

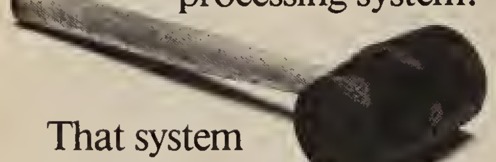
Dr. Stratton was the first director of MIT's Research Laboratory of Electronics, founded in 1946. Strongly interdisciplinary, it was viewed as the successor of MIT's Radiation Laboratory, where the major U.S. research that led to the development of radar was carried out.

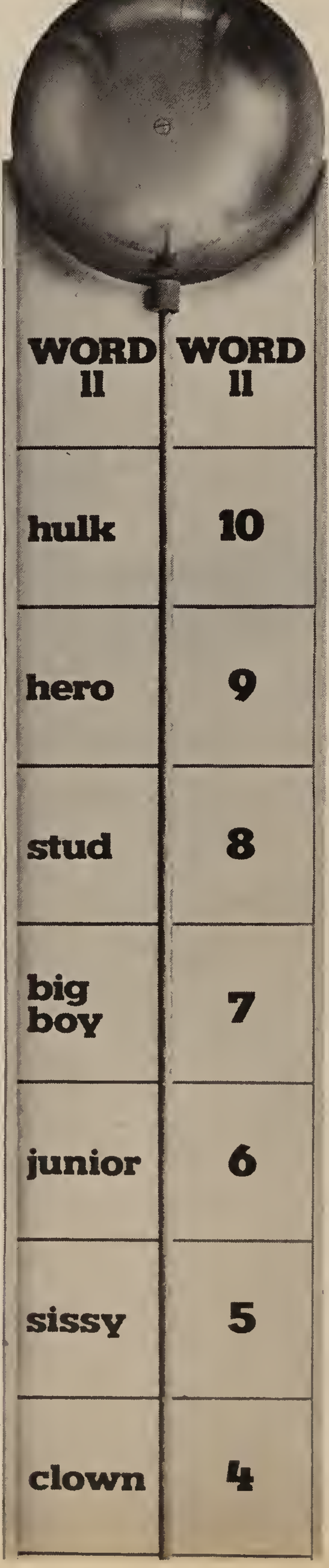
Under Stratton, the laboratory became the prototype interdisciplinary research center.

Stratton remained in this post until his appointment in 1949 as provost, MIT's chief academic officer. He then served as MIT president from 1959 to 1966.

STRONG WORDS.

Make it to the top on the strength of your words. All you need is the right word processing system.





That system is WORD-11. It's powerful. Sophisticated. Responsive. And surprisingly inexpensive.

It's designed for DEC's family of mini-computers. It's flexible, available on several operating systems, including RSTS/E and RSX-11M. It's talented, sharable, and supports a system of up to 50 terminals. And it runs concurrently with data processing.

But most important, it's proven. In hundreds of banks, universities and Fortune 500 companies, WORD-11 has been working hard for years.

So write for our brochure. Or ring our bell, at (714) 993-4160.

Data Processing Design, Inc., Corporate Office; 181 W. Orangethorpe Ave., Suite F, Placentia, CA 92670. (714) 993-4160. Telex 182-278. New York Office: 420 Lexington, Suite 647, New York, NY 10170. (212) 687-0104.

Take our WORD for it

Data Processing Design, Inc.

AUTHORIZED digital COMPUTER DISTRIBUTOR

Overseas Distributors:

Management Information Services PTY. LTD.
Melbourne, Australia

Jenson LTD.
Bristol, England

Network Computer Services PTY. LTD.
Sydney, Australia

Systime LTD.
Leeds, England

LA-120 USED $1,495
LS-120 USED $1,295

— IMMEDIATE DELIVERY —
— 30 DAY WARRANTY —

NEW AUSTRALIAN 745 $1,395
NEW DIABLO 1650 $2,450
NEW VT-52 $1,495
USED ADM-3A $ 525

TBC

TERMINAL BROKERS COMPANY
Box 312 • 37 Franklin Street
Needham, MA 02192
Call (617) 449-0216

Some Items Limited Quantity

Bell Labs Improves Glass Fiber Fabrication Rate

MURRAY HILL, N.J. — Researchers at Bell Laboratories here have devised a method to increase substantially the rate at which glass fibers used in light-wave communications can be fabricated. The technique is expected to make the technology more economically competitive with alternative transmission media.

Jim Fleming (left) and Paul O'Connor make adjustments on the apparatus they use to fabricate preforms for the glass fibers used in light-wave communications.

The researchers, Jim Fleming, John MacChesney and Paul O'Connor, have done this by using a plasma — a highly energetic mixture containing ionized atomic fragments — to speed up "preform" production, an early step in the fabrication process.

"The plasma technique speeds up the making of preforms for glass fibers while maintaining the fiber's transmission properties," Fleming explained. "Based on preliminary results, the preforms can be fabricated five times faster with this technique."

The technique is a variation on the generally practiced methods of the modified chemical vapor deposition (MCVD) process. MCVD was developed at Bell Labs in 1973, and a patent for the process was awarded Aug. 12.

In the MCVD technique as commercially practiced, the glass "preforms" that are eventually collapsed and drawn to form light-guides are made by passing chemical vapors into a glass tube.

With the plasma-assisted process, the vapors — instead of being heated only by an external torch — are heated within a zone that includes a plasma formed and maintained inside the tube by electromagnetic energy generally produced by an induction coil.

"The plasma fireball supplies the energy that helps propel the glassy particles toward the walls of the tube," Fleming said.

Since preform production is a significant part of fiber fabrication, increasing this rate should substantially reduce the cost of fabrication.

Seminars Set On DP, Personnel

NEW YORK — Management International, Inc. has developed four seminars for DP and personnel managers.

The seminars will be conducted in New York, Boston, Fort Lauderdale, Fla., Washington, D.C., and Toronto between Dec. 16 and March 17.

Topics Covered

The seminars, which are also offered on-site, cover "Developing DP's Strategic & Long-Range Plans in the 1980s"; "Productivity and Performance Planning for Programmers and Analysts"; "DP Recruiting: A Challenge for the 1980s"; and "Organizing and Managing the DP Human Resources Function."

Additional details are available from Management International, Seminar Data Center, Box 5111, FDR Station, New York, N.Y. 10150.

Women to Meet On Networking In New York

NEW YORK — The New York chapter of Women in Data Processing will hold a "Women Managers Network" meeting here Friday, Dec. 5 from 5:30 p.m. to 7:30 p.m.

Featuring a speaker from within the organization, the gathering will cost $10 per attendee.

It will be held at the group's headquarters at 310 Madison Ave., New York, N.Y. 10017.

IN THIS BUSINESS, IT'S THE THOUGHT THAT COUNTS

Thought. Original, imaginative and exclusively human. It bred electronic innovations and sparked the growth of companies like Teletype Corporation.

But to keep growing today, you have to think harder than ever. Which is why we are expanding one of the finest research teams in the world. To imagine the possibilities, and then build them.

For example, our research scientists imagined terminals that could relate to humans as well as they relate to machines. In joint efforts with the Bell System, they came up with significant improvements.

Like our patented tilt-screen to prevent glare. Brighter, more readable characters to prevent operator fatigue. Keyboards that let you feel actuation. And incredibly reliable printers.

But our growth goes beyond technological achievements, beyond our expanding service networks and record sales.

Its real measure is in thousands of offices where our customers use their imagination and our terminals to design, discover, organize and build.

And, in any business, that's worth thinking about.

TELETYPE.
WHERE DATA BECOMES INFORMATION.

Teletype Corporation, 5555 Touhy Avenue, Dept. 3143-F, Skokie, IL 60077. Tel. (312) 982-2000.
Teletype is a registered trademark and service mark of the Teletype Corporation, a Bell System Company.

Calendar

Dec. 8-12, Boston — **Structured Programming: Design, Coding and Implementation Techniques.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Dec. 15-17, Washington, D.C. — **Electronic Mail: An Overview of Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 15-17, Washington, D.C. — **Simulation Modeling and Analysis.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 15-17, Washington, D.C. — **Computer Performance Measurement: Tools and Techniques for Increased Systems Productivity.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 17-19, Wellesley, Mass. — **Project Management and Control.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., Wellesley, Mass. 02181.

Dec. 18, New York — **Microcomputers — Their Adaptability.** Contact: New York City Chapter of the Association for Computing Machinery, P.O. Box 245, New York, N.Y. 10017.

Dec. 29-30, Orlando, Fla. — **MC11 Effective EDP System.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Jan. 5-9, Wellesley, Mass. — **Fundamentals of Microprocessors and Microcomputers.** Contact: The Commonwealth Center, 900 Washington St., Wellesley, Mass. 02181.

Jan. 6-8, Houston — **Managing the DP Training Function: A Workshop.** Contact: Advanced Systems, Inc., 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

Jan. 7-9, San Diego — **International Symposium on Minicomputers and Microcomputers.** Contact: The International Society for Mini and Microcomputers, P.O. Box 2481, Anaheim, Calif. 92804.

Jan. 8-9, Honolulu — **International Conference on System Sciences,** sponsored by the Association for Computing Machinery, Inc. Contact: Prof. Ralph Sprague Jr., University of Hawaii at Manoa, College of Business Administration, 2404 Maile Way, Honolulu, Hawaii 96822.

Jan. 8-9, Arlington, Texas — **User's Role in Systems Development.** Contact: Q.E.D. Information Sciences, Inc., P.O. Box 181, Wellesley, Mass. 02181.

Jan. 11-14, Atlanta — **Conference of the Optical Character Recognition Users Association.** Contact: OCR Users, 10 Banta Place, Hackensack, N.J. 07601.

Jan. 12-13, New Orleans — **Strategic Planning for Information Systems.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Jan. 12-13, Sioux Falls, S.D. — **Computers in Farm Management.** Contact: Association for Educational Data Systems, 1201 16 St. N.W., Washington, D.C. 20036.

Jan. 12-13, Atlanta — **How to Achieve the Cost Savings and Sales Benefits of Manufacturing Resource Planning.** Contact: McGraw-Hill Publishing Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

Jan. 12-13, New York — **Distributed Systems.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Jan. 12-14, Philadelphia — **Data Base Fundamentals.** Contact: Q.E.D. Information Sciences, Inc., P.O. Box 181, Wellesley, Mass. 02181.

Jan. 12-14, Honolulu — **Pacific Telecommunications Conference.** Contact: Richard J. Barber, Pacific Telecommunications Council, 2424 Maile Way, No. 704, Honolulu, Hawaii 96822.

Jan. 12-16, Dallas — **Structured Systems Design and Structured Requirements Definition.** Contact: Ken Orr & Associates, Inc., 715 E. 8 St., Topeka, Kan. 66607.

Jan. 13-15, Milwaukee — **Microprocessor Fundamentals and Industrial Applications.** Contact: Instrument Society of America, P.O. Box 3561, Durham, N.C. 27702.

Jan. 13-15, Houston — **Communication Networks.** Contact: Communication Networks '81, Registration Dept., 375 Cochituate Road, Framingham, Mass. 01701.

YOU THINK YOU'VE GOT ORDER SERVICE PROBLEMS?

NO WORK STATION TOO REMOTE

THE MICRO-COM LINK

A small desk-top computer with a built-in communications modem providing unlimited computing flexibility. In a single configuration, the Micro-Com can operate as either a stand-alone computer, an intelligent work station for an in-house system, or a link to any remote computer service.

HAVE COMMUNICATION PROBLEMS? WHY NOT DISTRIBUTE YOUR INTELLIGENCE? IT MAY NOT COST AS MUCH AS YOU THINK. COMPUTER DEVELOPMENT SUPPLIES TURN-KEY SOLUTIONS! WE HAVE SOFTWARE, HARDWARE, AND PROTOCOLS (Direct link, telecommunications and TWX).

Featuring enhanced Zenith Data Systems Products and Service. Stand alone Modem and Software available for other systems.

LET'S COMMUNICATE!

HUMANS:
Leo Norman
(800) 547-1831 or (503) 646-1599
8:30-5:00, M-F, P.S.T.

MICRO-COMS:
(503) 646-5637
24 Hours a Day
7 Days a Week

COMPUTER DEVELOPMENT, INC.
6700 S.W. 105th
Beaverton, Oregon 97005

Calendar

Jan. 13-16, Los Angeles — **Programming in Ada.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., Santa Monica, Calif. 90405. Also being held Jan. 20-23 in Washington, D.C.

Jan. 14, New York — **The Expanding World of Data Bases: Perspectives and Prospects,** sponsored by the Metropolitan New York Chapter of the American Society for Information Science and the New York Chapter of the Special Libraries Association. Contact: Mary Glascock, Salvation Army Archives, 145 W. 15 St., New York, N.Y. 10011.

Jan. 14-16, Washington, D.C. — **Structured Design and Programming.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., Santa Monica, Calif. 90405. Also being held Jan. 28-30 in Atlanta.

Jan. 18-23, Montreal — **DP Training Managers' Workshop.** Contact: Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

Jan. 19, Los Angeles — **Cryptography and Data Security: Executive Summary.** Contact: Hellman Associates, 299 California Ave., Palo Alto, Calif. 94306.

Jan. 19-20, Hartford, Conn. — **Data Communication Systems Concepts.** Contact: The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Jan. 19-20, Houston — **Data Base Management Administration and Control.** Contact: Battelle Seminars and Studies Program, 4000 N.E. 41 St., P.O. Box C-5395, Seattle, Wash. 98105.

Jan. 19-21, Tampa, Fla. — **Jovial: Ada Users Group Meeting.** Contact: Austin Maher Singer-Kearfott, 150 Totowa Ave., Wayne, N.J. 07470.

Jan. 19-21, Palo Alto, Calif. — **Error Correcting and Detecting Codes.** Contact: Hellman Associates, 299 California Ave., Palo Alto, Calif. 94306.

Jan. 19-22, San Francisco — **Structured Systems Analysis and Design Seminar.** Contact: Oberland Associates, 4036 N.E. Sandy, Portland, Ore. 97212.

Jan. 19-23, St. Louis — **Structured Systems Analysis and Design.** Contact: Improved System Technologies, Inc., Suite 4500, 888 7 Ave., New York, N.Y. 10106. Also being held Jan. 26-30 in Washington, D.C. and Los Angeles.

Jan. 20-23, Long Beach, Calif. — **Hospital Information Systems Meeting.** Contact: Hospital Information Systems Sharing Group, 2415 S. 2300 W., Salt Lake City, Utah 84119.

Jan. 22-23, Los Angeles — **Summit Conference on Computers,** sponsored by the American Institute of Aeronautics and Astronautics and the Education Foundation of the DP Management Association. Contact: Summit, 5959 W. Century Blvd., P.O. Box 91295, Los Angeles, Calif. 90045.

Jan. 26-27, Miami — **Records Retention and Microfilming.** Contact: Thomas Wilds Association, Inc., 516 Fifth Ave. New York, N.Y. 10036. Also being held Jan. 28-29 in Miami.

Jan. 26-27, Miami — **Security and Audit of Data Centers.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Jan. 26-28, Dallas — **Fundamentals of DP for the Nondata Processing Executive.** Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Jan. 26-28, Washington, D.C. — **The IBM 4300 Series.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

Jan. 26-28, Monte Carlo — **Honeywell's Computer Security and Privacy Symposium.** Contact: Security Symposium, Honeywell Information Systems, M/S T-99-4, P.O. Box 6000, Phoenix, Ariz. 85005.

Jan. 27, Luxembourg — **European Information Providers Association Symposium.** Contact: Providers Association, P.O. Box 38, Oxford OX1 5LG, England.

Jan. 27-29, Atlanta — **Basic: A Computer Language for Managers.** Contact: The American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Call for Papers

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS (AIAA) COMPUTERS IN AEROSPACE III CONFERENCE, San Diego, Calif., Oct. 26-28.

Original papers are being sought for this conference, whose theme is "Computer Technology: Enhancing Performance and Productivity." Subjects dealing with computer systems technology incorporated into embedded systems for aerospace applications are of special interest, and also microprocessors and support circuits, novel architectures, memory devices, radiation hardened components, semicustom PLAs, custom very large-scale integration and very high-speed integrated circuitry implementations, emerging semiconductor approaches, requirements and design specifications for software, development tools, distributed systems networking, space applications, project planning and organization of resources, contractor interaction and costing and procurment areas.

Digests of less than 1,000 words must be submitted for review by March 2 and should include title, author, address, a concise statement of the problem and the objective of the paper, along with a summary of important conclusions.

Digests should be sent in triplicate to the appropriate reviewer for AIAA. Further details can be obtained from AIAA headquarters at 1290 Ave. of the Americas, New York, N.Y. 10019.

URBAN AND REGIONAL INFORMATION SYSTEMS ASSOCIATION (URISA), New Orleans, La., Aug. 16-19.

The theme of this conference is "The Link Between Users and Providers," and Conference Chairman Samuel Trotter is looking for papers. Potential topics include planning, physical and economic development, geo-coding, general data processing, human service delivery systems, neighborhood information systems, natural resource management, remote sensing, financial management systems, social indicators, public safety and labor relations.

Two copies of a half-page abstract should be submitted to the Urisa chairman by Feb. 1 at Suite 300, 2033 M St. N.W., Washington, D.C. 20036.

ADDRESSABLE LINE PRINTERS

INTERFACES → PRINTERS

Burroughs Poll/select, IBM 2260, 2780, 3270, 3780, etc.
Univac DCT 1000, 1004
Honeywell VIP 7700
NCR poll/select
plus others

Centronics, Data products, Printronix and Florida Data Printers

COMPUTER ALLIANCE CORPORATION
299 Forest Avenue, Paramus, N.J. 07652
Telephone 201-265-3650

OUR DISKS ARE FLEXIBLE. OUR STANDARDS AREN'T.

We certify every *Ectype*™ flexible disk we make. Not every other one. For full details, call us toll-free at 1-800-843-9862.

SYNCOM®
Your flexible alternative
P.O. Box 130, Mitchell, South Dakota 57301

TSO USERS!

THE Applied Software TSO/SUPERSET-UTILITIES IS THE BEST ALTERNATIVE TO IBM

Compare:	Applied Software's TSO/Superset Utilities	IBM'S TSO Data Data Utilities
Cost	$130/Installation	$144/CPU
Software Support	Class "A"	Class "C"
Full-Screen Support	Yes	No
132 Column CRT Support	Yes	No
LISTJES Command (SYSOUT Previewer)	Yes	No
TSOSORT Command	Yes	No
JTIP Interface	Yes	No
Fast Merge	Yes	No

WRITE OR CALL FOR FREE BROCHURE AND TECHNICAL COMPARISON

Applied Software, Inc.
4440 P.G.A. Boulevard, Suite 204
Palm Beach Gardens, Florida 33410
(305) 626-4818
OVER 300 TSO CUSTOMERS WORLD WIDE

Model 14 'Data Logger'

Display... Save... Review

TELERAY
DIVISION OF RESEARCH INC
BOX 24064 MINNEAPOLIS, MINN 55424
800-328-6179

Who Makes Up Ansi Standards? What Formula

Q I will be graduating with a master's degree and have accepted an offer of employment with a computer manufacturer and refused all others but one. I interviewed with a company six weeks ago and was told to expect a decision in two weeks.

Yesterday, out of curiosity, I called for a status report. The personnel department said that the Management Information Systems (MIS) Division was reorganizing and that they were delaying any decisions until after the reorganization. Reorganization or not, they have 20 slots that they need filled.

I would have considered a job offer with this company earlier but certainly not now, although I am interested in seeing how long it takes them to respond.

How should I respond?

A The company has an obligation to render a quick decision on your interview and you have an obligation to immediately terminate negotiations after you have accepted a position.

Address the letter announcing your employment intentions to the director of the MIS Division. Include an informative, not hostile, statement of your less-than-hospitable treatment. This feedback may be the most important piece of recruiting information the director will receive all year. A competent director will ensure that those who follow you will not suffer the same neglect.

Q Many of the DP problems that you address can be attributed to the high rate of personnel turnover, a plague that is sweeping the DP industry. Although my company's turnover rate is not much different from that of the industry, I refuse to accept high turnover as a given.

Our management staff has made a long-term commitment to reduce the rate of turnover. Our initial efforts centered on the compensation package, which was increased to well above local norms. In our case, high salaries were not the solution.

We can't afford another expensive failure. Perhaps you or your readers who have had success in curtailing personnel turnover would share some tried and proven solutions. This would be helpful to the whole industry.

A Congratulations on overcoming the most formidable obstacle to personnel retention — recognition of the problem. Too often data centers accept a high turnover rate as part of doing business. It doesn't have to be that way. I recently visited a medium-sized installation that has not lost a DP professional in over four years.

I, like you, think we can benefit from the insights of managers of DP installations who have been successful in minimizing personnel turnover. I would like to invite readers who have experienced success in retaining personnel to share their methods and approaches.

Q I am a financial business applications programmer (Cobol) with two years of DP experience. I have a B.S. degree in accounting and an M.B.A. in management. I have reached a point in my career where I would like to broaden my DP education and background.

I would like to know if you could recommend any DP-oriented organizations that I could join and what, if any, suggestions you might have as to the type of education I could pursue to broaden my DP background. I would appreciate any suggestions you could offer.

A Your academic background and experience provide an excellent foundation for a career in DP/MIS auditing. You may have several educational voids that you need to fill while pursuing this career path.

You should have a complete grasp of the entire system life cycle including not only programming, but systems analysis, design, conversion, implementation, evaluation and ongoing operation.

Although the principles of general auditing that you studied in your M.B.A. program are complementary, you'll need to study DP/MIS auditing specifically.

Plan to attend seminars and/or conferences on DP privacy and security to obtain an awareness of the scope and importance of these areas to the auditing function.

Formal education in the area of DP/MIS auditing is limited to a few professional seminars and isolated university courses. The members of the EDP Auditors Association chapter in your city, or in other cities throughout the country, can help direct your educational efforts.

Q I have been using Fortran for a long time now. The shop I work for markets a large engineering applications program. Because our code runs on several diverse machines (IBM, Univac, Control Data Corp., Digital Equipment Corp. VAX-11/780 and Cray Research, Inc.), we code in Ansi standard as much as possible.

Who are the people that come up with the standards, and how can I, a user, make my needs known to them?

A The American National Standards Institute (Ansi) is a pri-

TELEX SERIES 80: THE BEST TAPE DRIVE FOR 4300 SERIES PROCESSORS.

Congratulations. You've upgraded to—or at least ordered—IBM 4300 Series processors to gain major price/performance improvements and environmental enhancements. Now, what about your tape drives?

Telex Series 80 tape drives are the perfect match for 4300 processors. Like the IBM 4300, Series 80 is based on proven technology. It outperforms its competition, and is lower in price.

Series 80 drives offer 6250 bpi (GCR), 1600 bpi (PE) and 800 bpi (NRZI) data formatting—at transport speeds up to 125 ips; all with capabilities beyond those normally required on 4300's and at a price well below IBM's comparable offerings.

Series 80 is smaller and lighter than the IBM 3420 and its equivalents. Five Telex drives fit comfortably in the space normally required by four IBM drives. Series 80 also generates 30% less heat and consumes 35% less power. Patented Telex features like the Supr-Lite™ Capstan and Telex Tape Path ensure smooth, reliable back-up storage.

For more information on the tape drives made to complement your 4300 processor and other IBM systems, contact your nearest Telex representative. Or call Series 80 Marketing toll-free (800) 331-2623.

The innovation continues... TELEX®

Telex Computer Products, Inc.
Terminals/Peripherals/Data Entry and Word Processing Systems/OEM Products

6422 East 41st/Tulsa, Oklahoma 74135/(918) 627-1111
332 Consumers Road/Willowdale, Ontario M2J1P8/(416) 494-4444

Gives Number of Tapes Per File?

vate, nonprofit organization that coordinates America's federal national standards system. The Ansi federation consists of over 900 companies and 200 trade, technical, professional, labor and consumer organizations whose members have cooperated to establish approximately 10,000 standards that encompass virtually every field and discipline.

The American National Standards Committee X3, Computers and Information Processing, is the primary support committee for the computer community. The Fortran technical committee, within Committee X3, establishes Fortran standards.

Eighty-nine technical and working group committees support standards maintenance and development in seven categories: recognition, media, programming languages, documentation, data representation, data communication and systems engineering.

Suggestions for improvement and update of standards are welcomed and should be addressed to: Administrative Secretary of X3 - Cbema, 1818 L St. NW, Washington, D.C., 20036. Those persons or groups desiring to initiate a standards development project should request a Form SD3.

The latest American National Standards Committee X3 membership roster listed only 19 manufacturers of computing hardware and 14 special interest groups.

Standards are a serious problem facing the future of computers and information processing and are the responsibility of all those involved. Several major suppliers of computing hardware and software and many influential special interest groups were conspicuously absent from the list. Information concerning membership can be obtained at the same address.

Q I would be appreciative if you can provide, through Turnaround Time, the formula for calculating how many tapes are required for one file. Factors of the formula should be record length in bytes (R), tape BPI (B), blocking factor (F), number of records (N) and so on.

A Gladly, but you'll also need tape length in inches (T) and interblock gap length in inches (I).

Number of tapes required =

$$\frac{N}{\left[\dfrac{T}{\dfrac{R(F)}{B}+I}\right]F}$$

Q After 13 years of moving up through the ranks of several DP organizations, I feel that it is time to move into a No. 1 or 2 spot (director or assistant director of DP).

How does one find out about such openings? Most of the ads are for the lower level positions. Are there reputable placement agencies that specialize in these jobs? If so, how do I find out about them?

A It stands to reason that the number of job opportunities for directors or assistant directors of DP would be somewhat less than the number of the lower level positions, and so it is with the listings of professional placement agencies and the positions announcement section of *Computerworld*.

Checking the CW classified section for 4 consecutive weeks, I counted an average of 10 DP director positions per issue. All DP placement agencies that I contacted assured me that they had listings for the top slots.

These positions are available, but my experience has shown that the vast majority of these positions are filled from within or via internally generated recommendations. In your case, I'm assuming an internal promotion is unlikely, for whatever reason; therefore, I would suggest that you make yourself known through informal conversations at local professional society meetings, major regional and national conferences, professional seminars and, perhaps, by publishing articles in DP periodicals.

To my knowledge, no DP placement service specializes in listing positions for director or assistant director. You did not indicate your present position or size of your installation, but, in order to broaden the scope of potential job opportunities, you might consider a move to a larger installation as director of programming and/or systems and use this position as a stepping stone.

Be advised that the scope of the job function of the assistant director varies considerably from one company to the next. The assistant's job function may vary from routine administrative tasks with no line authority to actually managing and controlling the DP department.

Turnaround Time
By Larry E. Long

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.*

Long is a professor at Lehigh University, a DP consultant and author.

If you can write a witty-one-liner as good as these, you could be a winner in the 1981 Computerworld button contest.

As all you button freaks know, *Computerworld* buttons have become a tradition in the industry. And every year we distribute tens of thousands of them at NCC, Info, and other trade shows across the country.

Last year, for the first time, we let our readers do the writing, and our judges do the laughing. We spent many hours sifting through hundreds of entries, and, at last, six winners (shown above) emerged from the smoke-filled room. The judges staggered out later.

This year, despite protests from the SPCBJ (Society to Prevent Cruelty to Button Judges), we've decided to do it again. And we're hereby *soliciting your suggestions.* They should be *short,* funny, relevant — and at least moderately clean.

As many as six suggestions will be chosen by our (by now) experienced panel of judges, based on criteria known only to them. If your entry is among those picked, you will receive a certificate of appreciation suitable for impressing your friends and fellow workers.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (at least their entries will) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky souls will receive a free hand-held computer game valued at well under $100 (if we can find some cheap enough).

You may not enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representations as to their competence, skill or fairness are being made. Deadline for entries is January 2, 1981 in our offices in Framingham.

yes,

I'd like to enter Computerworld's ridiculous button contest. I hope your judges can read. Here is my entry (if you have more than one, please put them on separate forms). (All entries become property of CW Communications/Inc.)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Write your entry here.

____

____

NAME____________________________
Company _________________________
Address __________________________
City__________ State________ Zip_______

**Send to: Jack Edmonston, Marketing Services Department,
Computerworld, 375 Cochituate Road, Framingham,
MA 01701**

EDITORIAL

The OECD Privacy Guidelines

The Organization for Economic Cooperation and Development's (OECD) privacy guidelines are passed about quite a bit at major telecommunications conferences these days. That's because the world's economy is considered at jeopardy if U.S. companies tied to transborder data flows fail to meet the guidelines.

A number of nations, not all of them members of OECD, have enacted laws that restrict export of data into computers beyond their borders. Privacy concerns are usually the pretext for such measures, which affect many U.S. corporations with overseas branches.

America's trading partners feel threatened by the continuing U.S. domination of information technology; they see their national sovereignty at stake so long as the U.S. seems able to tap their data banks using the world's most powerful processors. Moreover, U.S. hegemony in the technology is perceived as a direct economic threat, undermining domestic data processing and telecommunications industries in nations whose users import most systems and services.

According to a National Telecommunication Information Agency (NTIA) senior policy adviser, some nations represented in the OECD are so worried by these problems that their governments may require treaties with the U.S. as preconditions for further commerce [CW, Nov. 24]. The treaties might obligate Americans to refrain from privacy violations, secure their systems to a specified extent and even restrict overseas processing operations.

Historically, treaties are not signed frivolously; they often have been attempts to avoid war and have limited many a nation's political and economic expansion.

However, the privacy guidelines issued by the OECD executive council in September may dissipate pressures for transborder data flow treaties if the U.S., which endorsed the guidelines, abides by them, the NTIA official suggested. The guidelines are seen abroad as filling a certain vacuum in American policy on transborder data flow.

A number of experts on the use of financial systems have recently warned that further tightening of transborder data flow controls could worsen the world's general economic slump and even set off a major economic depression [CW, Nov. 10]. Such legislated or de facto controls are tantamount to tariffs, these experts have pointed out.

When economics is the official reason, those advocating tighter data flow controls often complain that jobs will be lost to the foreign technology suppliers unless the controls are tightened. But their arguments often ignore the fact that systems exporters usually need to create jobs in the countries they serve; and they do serve those countries if their products are marketable.

Users around the world should agree to meet minimal standards of privacy protection before transborder data flows critical to international commerce are severed. Those advocating formal tariffs on transborder flows to protect their nation's economic health have a lot of explaining to do.

DATA PAST

Five Years Ago
Dec. 10, 1975

TALLAHASSEE, Fla. — A Brevard County official on the way to his father's funeral was shot and killed near here by a Florida state trooper who mistook his car for a stolen vehicle after checking with the state's crime computer. The victim's auto bore a license number identical to another issued in 1971 which was still in the active stolen vehicle data base.

Eight Years Ago
Dec. 6, 1972

DOVER, Del. — The DP director for the State of Delaware charged IBM with trying to ruin his career because he chose another source for computer equipment. "On the morning of Nov. 14, an IBM representative came to my office and, in the presence of witnesses, informed me that I was 'finished' in the state," Arthur Hill, director of central DP, said.

'So how do we tell him that doesn't include software?'

LETTERS

Responsible Reporting

In his letter, "Scare Tactics" [CW, Nov. 10], Barry R. Hemphill pointed out that he has only 1,000 hours of flying time, but he does have more than 22 years' experience in the information system history.

Our seven years of contact with the media with respect to aviation safety problems has fairly well borne out the fact that media writers, in general, do a credible job of reporting. Although there may be technical discrepancies at times, most of these have little impact upon the mass of information presented in papers and on television. Therefore, Hemphill's advice that *Computerworld* should stop quoting the media is not necessarily the best.

Second, we have seen CW print the rhetoric of both the Federal Aviation Administration (FAA) and the Professional Air Traffic Controllers Organization (Patco). To say that CW is biased and one-sided to the labor/-management dispute would be incorrect. There is a reality to the issue of aviation safety and computer utilization. In a phrase: "It is all fouled up!"

We believe CW has done a very responsible and ethical job of reporting some of the significant failures of the system. Hemphill can check that by examining the U.S. Senate Appropriations Committee report entitled "Report on FAA's En Route Air Traffic Control Computer System," Report 80-5, October 1980.

It is time for the American public to face the reality of our National Airspace System (NAS). The NAS is sensitive to disturbances and tends to be unstable. Fortunately, there are excellent pilots and controllers to keep the laws of chance from working against us.

John B. Galipault
President
Aviation Safety Institute
Worthington, Ohio

Gravy Train

Charlene Francl and W. Thomas Lin say that programmers now rank salary as the top job motivator ["The Gravy Train Derails," CW, Nov. 10]. The authors may be right, but their conclusions conflict with prior findings and the basis for their conclusions is weak.

The Francl and Lin study consisted of asking 80 in-house programmers from the Los Angeles area to indicate the relative importance of eight job factors. Only 50 of the questionnaires were returned. A 63% response rate is sometimes sufficient for drawing valid conclusions, but only when the initial sample is clearly representative of the whole population or the initial sample size is much larger than 80.

It is quite possible that the 50 programmers who took the time to fill out and return the questionnaire are different in some important way from programmers in general. For instance, the 50 may be those most anxious to complain about their jobs.

Often, those of us who help DP managers make the most of human resources have to proceed on educated guesses. But not when the issue is programmer motivations. Here, a good, solid base of findings exists. Francl and Lin serve us all well by summarizing those findings and discussing the implications. However, to adequately challenge that good, solid base, they need a large, representative sample or a better constructed logical argument.

Bruce Sanders
Vacaville, Calif.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

COUGER ON EDUCATION/J. Daniel Couger

'Half-Asked' Questions on Productivity

"What is the time comparison for writing vs. processing a programming instruction?" I was asked this question in a recent class. The resulting calculation produced a very interesting statistic — worthy of careful consideration by DP management.

Before answering the question, I asked member of the class to give me their estimates of the ratio of processing vs. coding. Most guessed 10,000 to 1. One student thought that figure far too low and estimated 100,000 to 1. We then computed the correct answer. The ratio of processing to coding is more than 100 million to 1.

In the *Mythical Man Month,* Fred Brooks analyzed a large number of projects to produce the following statistics on programming output. The figures cover the whole program development process: preparation of specifications, design, coding and testing.

Type of Development	Lines of Debugged Code Per Year
Batch	6,000-9,000
Compiler	2,000-3,000
Operating System	600-800

An IBM 370/148 performs at .4 million instructions per second (Mips). Even if we use the highest level of programming output (4.5 instructions per hour for developing batch systems), the computation yields a ratio of 320 million to 1.

One might get enmeshed in the calculations and forget the message — the ratio is increasing precipitiously. For an IBM 4341 (.7 Mips), the ratio is 560 million to 1. For a 3033 (4.5 Mips), the ratio is 3.6 billion to 1.

Before we discuss the implications, let's simplify terms. We will refer to the IPS/ICS ratio (instructions processed per second/instructions coded per second) simply as the processing/-coding ratio, or the P/C ratio.

The above figures show that programming improvements have not kept pace with technology. Although programming techniques such as the "programmer's workbench" have produced a 30% to 80% increase in productivity, computer processing capability doubled during the same span of time.

Improving the Ratio

Massive efforts have been undertaken to improve programming techniques. My office shelves contain more than 25 books on techniques to improve programming efficiency. I have more than 50 proceedings, papers and journal articles on the same subject. Despite these efforts, labor costs climbed to more than 50% of the typical DP budget this year for the first time.

Compared with the abundance of research and writing on technical improvements, there is a minuscule amount of material on improving motivation of programmers and analysts. Searching for ways to improve motivation should receive attention equal to that focused on finding new technical approaches. Stated another way, the *same* levels of improvement realized by techniques like the programmer's workbench can be obtained through redesign of the motivational environment for programmers and analysts.

A principal reason for the lack of books and papers on motivation is the absence of hard data on the subject. Most publications provide the writer's speculations on the subject.

Research Results

This month the results of our research — hard data — are being published. *Motivating and Managing Computer Personnel,* co-authored by Robert Zawacki and myself, has now been released by John Wiley and Sons, Inc., 605 Third Ave., New York, N.Y. 10016 ($19.95). Our data base contains information on 4,000 people (more than 1,000 analysts and programmers, 2,000 operations personnel and 1,000 managers of DP). The statistical reliability and validity of the survey methodology have been substantiated. Although preliminary results were published in *Computerworld* and *Datamation,* the book contains a large amount of new material. An example is the task/GNS matrix, described below.

One important survey result was the identification of new approaches for work assignment, based on the growth need strength (GNS) of the individual. GNS is the need for personal accomplishment — for learning and developing, for being stimulated and challenged. The book provides a four-quadrant matrix to increase productivity through better matching of work assignments to individual GNS.

For example, assigning new system development projects to personnel with low GNS rarely produces motivation; low productivity typically results.

A second matrix suggests the optimum leadership style to use with each of the four task assignment/individual GNS match-ups. The leadership styles are: 1) directive, 2) supportive, 3) participative and 4) caretaker.

For example, assume the situation described above, where the supervisor had no alternative but to assign a new development project to a person with low GNS. This situation is characterized by subordinates who, either because of lack of ability or desire, have difficulty coping with this ambiguous situation. As a consequence, they would be expected to have difficulty in structuring their own activities.

The function of the leader would be to provide task structure by planning, organizing, coordinating, directing and controlling the work of subordinates. Such behavior is analogous to directive leadership. This form of behavior by the leader would relieve the ambiguity, thereby improving productivity.

However, such a leadership style would be entirely inappropriate for

(Continued on Page 48)

THE TAYLOR REPORT Alan Taylor

New Environment Requires 'Application' Safeguards

Oscar Rodriguez, president of American Business Systems (ABS) of Westford, Mass., has reason to be happy that he backed Cobol for the application products when he formed a new company two years ago — and to feel lucky in choosing a Zilog, Inc.-based compiler which has become the transportable RM-Cobol compiler.

ABS' financial modeling package, real-estate application and accounting are all able to run in many different operating system environments in the traditional microworld, and in the lab the new 16-bit Cobol compiler is being tested for much greater expansion of usable environments next year.

Indeed, with more working applications now available than any of the other known RM-Cobol wholesalers — most of whom are still gearing up for first announcements next year — the firm has been attracting buy-up offers.

However, ABS has not reached its position without developing an understanding of what really transportable Cobol or other applications need to implement properly. This type of design thinking has aspects that don't show on the surface, but can make all the difference between reliable and unreliable transportable systems. It is worthwhile to look at the ABS implementation design.

When a Cobol compiler can move from operating system to operating system, from hardware to hardware, the application programs produced by the compiler will at least run during tests. Ths problems then are not in lack of compatibility, but in providing for a guarantee of durable, reliable use. And this is an application problem in any multivendor situation, as it is not possible to call a single service organization and complain any time any output is wrong!

Needed Application Response

In the new situation, it is accepted that the application programs must take account of the possibility that there may be operating system problems or hardware problems. "After all," Rodriguez pointed out, noting his applications run under CP/M, Unix, RIO, TRSDOS and other operating environments, "we cannot test the flock of hardware out there each time an operating system version is distributed."

To solve the problem and to complete the reliability of the systems, some way has to be found to prevent mistakes in operating systems, in the compiler or in the hardware from hurting the file contents. If possible, accurate operation should be provided in the face of intermittent error. And the de-

(Continued on Page 48)

READER COMMENTARY/Paul Sita

Many Sites Ignoring Disaster Recovery Basics

Today there is an almost universal interest in disaster recovery and contingency planning. Without a doubt, the topics are in discussion everywhere. Recent statistics indicate that the majority of corporations even claim to have a disaster recovery plan in place.

However, the field is so new that standards do not yet exist. Like "data base", "disaster recovery" means something different to every organization. Few can agree on the required contents or an acceptable format for a comprehensive plan. Still, our experience has brought out some very general points that are worth mentioning.

1) Most companies have not sufficiently analyzed the possible risks associated with any significant data center downtime.

2) Considering the actual risks involved in a data center disaster, most companies have not committed anywhere near the amount of resources required to negate those risks.

3) Most corporations have never conducted a thorough test of their disaster recovery plan.

4) Most corporations have no regular program for the maintenance of their disaster recovery plan.

The majority of the work already done in the area of disaster recovery planning has concentrated on hardware capability. In some instances, backup facilities have been contracted for, in others reciprocal agreements with corporate data centers have been negotiated. Still other organizations have analyzed their critical applications from a system resource point of view.

Many of the contracts are sketchy, however; they do not guarantee the amount of computer time a reciprocating organization is required to provide, nor do they spell out exactly what I/O devices and communications facilities will be available. In many instances, no clear-cut provisions or rules have been laid out for the joint use of a single data center.

Problem Waiting to Happen

In such a critical matter, anything not perfectly clear is only a problem waiting for a time to surface. The message is clear: Management must know what it wants and needs, and the backup processing arrangements selected must be equal to those needs by means of contract.

Because DP is a technical discipline, most of the disaster recovery plans already written do include a fairly comprehensive rundown of system requirements from a software and hard-

(Continued on Page 48)

Battle Between Assembly, High-Level Language

SOCIOLOGY OF COMPUTING/Robert L. Glass

In this story, the names of many of the people, places and things have been fabricated . . . but the computing essence of the story is true.

The battle between assembly language and high-order language advocates is age-old in computing.

There are those people who wouldn't touch a HOL even if the direction to do so came from God. And there are others who wouldn't touch an assembler even if they got paid for every microsecond they saved in doing it.

This is not a story about who is right or wrong in that battle. This is a story about a project that failed because one stubborn language advocate couldn't change his mind.

Studs Axeswinger, you must understand, is one of your all-time macho programmers. His self-belief is second only to his swagger. When his company issued some bumper stickers saying "General MPG's Way Is My Way," he was the only person in the company who cut it apart and put it back together to say "My Way is General MPG's Way." When the president of MPG passed through his work area shaking hands one day, Studs was the only guy who told him what he thought of company policy and then handed him a written grievance list. "Doubt" simply wasn't in Studs' vocabulary.

Studs is also a died-in-the-wool assembly language programmer. He's been writing an assembler now for more than 20 years, and he doesn't see any reason to change his style. Fortrans may come and Cobols may go, but Studs continues to load registers and shift and "exclusive or" with the best of them.

Not that his style is a bad one. Studs can probably cram more functions per cubic centimeter into a computer than any other programmer at General MPG. Rumor has it that no one has ever been able to take over and maintain a Studs Axeswinger program because they're virtually unfathomable, but then that rumor is irrelevant because Studs has always been around to do it himself.

On His Own

So Studs is tolerated. No, he is more than tolerated. No matter how all-encompassing the rolling-stone trend toward HOL becomes, Studs is allowed to stand well clear of its impact.

Studs, in fact, is singled out for special benefits. He has a private office just off the computer room. He has a 24-hour key to the corporate gate. And he has a parking pass that puts him between the sixth vice-president and the assistant comptroller. (Rumor has it that he won it at an all-night poker game, but that is another story!)

In short, Studs is an institution at General MPG. Nearly, in fact, a legend. And in his own time.

Now let me digress from the world of Studs Axeswinger for a moment. Have you heard of the programming language Ada? It's the Department of Defense's (DOD) attempt to standardize on a computer programming language. The Army, Navy and Air Force have run around inventing enough new languages of their own, DOD feels, and it's time to herd them into line.

Because of the impact of Ada and the apparent inevitability of its use, each of the services is taking some hard looks at what Ada really means to them. "How well can Ada do the jobs I need to do?" is the burning question of the military day.

Government Projects

You may or may not know that General MPG builds more than passenger cars and trucks. Over the years, General MPG has also found it important to build a few products for the government as well. Like a rocket-firing antitank killer for the Army, complete with vinyl bucket seats and whitewall high-traction tires; and electronics systems for the F-222 fighter plane complete with a console plaque that says "This avionics system built especially for" and a blank to scratch in the correct operator's name.

So when the DOD speaks, it isn't just the triservices who listen. It's contractors like General MPG, as well.

It's time make this digression relevant to Studs. Now it is no military secret that General MPG wanted the jeep replacement contract, when it came up for bidding. The old World War II jeep, although universally loved and many-times modified, was well past its prime by the time the Army asked for proposals for a new one. General MPG, of course, was the favorite bidder. No, I don't mean that it had an inside track on the contract. I just mean that in Las Vegas they were quoting 8 to 5 that MPG would get it.

You may not realize it, but almost all

READ NCR CASSETTES
INTO YOUR
MAINFRAME
ON SITE
OR VIA
TELECOMMUNICATIONS
call or write
COMMERCIAL DATA PROC., INC.
2241 S. Grand Blvd.
St. Louis, Mo. 63104
(314) 776-1130

Results in Project Collapse for 'General MPG'

new military hardware uses computers by now. Even the new jeep, as most competitors saw it, would have a family of microprocessors tending such functions as operator panel displays, the carburetion system and the ignition. General MPG, rumor had it, went a few micros further.

Studs' Assignment

The question naturally arose, "What language will the micros be coded in?" And Studs, to get the story back on track, was assigned to make that decision.

That may strike you as a peculiar personnel assignment. Of course, you are right. It was sort of like letting the tobacco companies set the ground rules for phasing out cigarette smoking. The final result was predetermined — in spades.

As time passed, Studs almost forgot he had been assigned to work the problem. At the last minute, just before the proposal was due, he broke out a rationale for writing in assembly language he had first written in 1958, crossed out the word computer in a few places and wrote in microprocessor. He turned it in and off went the proposal.

More time passed. The Army was carefully evaluating the Jeep II proposals, and that can be a lengthy process.

Then one day the results were announced. Two finalists had been selected for final negotiations — and General MPG was one of them.

Elation reverberated throughout the MPG halls. Jeep II was a big contract. The name of the game, MPG knew, had to be and could well be "Win."

If you've been paying attention throughout this story, you have already guessed what happened next. Remember the inevitability of Ada? Well, that inevitability encompassed Jeep II. And remember the intransigence of Studs Axeswinger? A monumental clash was brewing between Studs' assembler language part of the proposal and the Army's need to use Ada.

The early part of the MPG-Army negotiations went pretty well. The Army had been a little appalled at the yellow striping down the side and the American Eagle painted on the hood, so MPG removed that part of their proposal and cut the price accordingly. Olive drab mohair upholstery with orange leatherette inserts was an Army preference, and MPG put it in as a no-cost extra.

Even when the computer component of the contract came up, MPG was agreeable. "You want Ada, you get Ada," said the chief negotiator. Studs, who was sitting in on the meeting, almost swallowed his unlit cigar.

"No way," he roared from his preassigned spot near the back of the room, leaping from his chair and striding forward. Before the MPG negotiator could stop him, he was pounding on their table. "We used assembler on the Automated Multiple Grenade Launcher system," he bellowed, "and will use assembler on Jeep II. And you can take your Ada and stuff it up your . . ."

They were ushering him out of the room by then, and hardly anyone heard him say "tail pipe."

A studied silence descended on the room. The MPG negotiators tried to pick up the pieces, but to no avail. MPG had no other language expert in the room. The impression so clearly left by Studs that MPG would never use Ada could not be corrected. The meeting adjourned not too long after.

Time passed interminably while MPG waited to hear about Jeep II. The final word, in fact, came as it often does, by newspaper.

"General MPG Loses Jeep II Contract," said the *Evening News* page one headline. Auto industry watchers the world over were mystified. How could the favorite have failed?

Little did they know that the age-old battle between assembly language and high order language had claimed yet another casualty!

Oh, and Studs Axeswinger? Well, he still has his office and his key and his parking pass.

But he doesn't get invited to negotiating sessions any more!

'You've referred to Our Marriage as an Emotional *Interface* for the Last Damn Time, Harold!'

HP3000 USERS:
FREE PAINT OFFER.

Hewlett-Packard is a computer company that also makes disk drives. If you own an HP computer, say the 3000, you know just how good it is. And if you want drives with the same brand name, right off the shelf, then you know that HP's drives, such as their 7925s, will make a pleasant and color coordinated match. But here's something you may not know: *the best drives to attach to your HP3000 are not made by HP.*

DON'T COMPROMISE, SPECIALIZE.

We are United Peripherals, a new company founded on the proposition that some folks do certain things better than others—and that few folks do all things better than anyone else, particularly when it comes to computer peripherals. Sure, HP can offer you the same name on the console, and the same color. But when it comes to performance and capacity, when it comes to space savings and cost savings that are so critical today, you should go to the folks who don't think of drives and controllers as "convenience" items, as profitable incidentals. You should go to folks who specialize, who innovate in those areas because their very existence depends on it.

COMPANIES LIKE CDC, MICROCOMPUTER SYSTEMS, AND UP.

Let's start with us. UP. We put peripheral systems together, utilizing the best components and attaching them to the finest minicomputers. Because we are directly affiliated with Microcomputer Systems Corporation, finding the specialist in disk drive controllers was simple enough. MSC has shipped more controllers than any manufacturer in the industry. As for disk drives, you don't have to look any further for a specialist than CDC, another Number One company. Bringing all of the elements together into a superior system is the job of UP. Our credentials follow.

THE UP1696. SUPERIOR BY ANY MEASURE, EXCEPT MAYBE COLOR MATCH.

Our UP1696, featuring the powerful 600-mb CDC 9775 and the sophisticated MSC 1696 controller, opens up a whole new world of possibilities for HP3000 users. First, *capacity.* The UP1696 is command set and software transparent to the HP3000. To the computer, it actually looks like four 120-mb HP7925s. So, instead of the maximum capacity of 980 mb possible with HP, you can expand, at your own pace, to 3840 mb with eight of our drives.

Beyond capacity, and largely because of it, the UP1696 opens up a world of savings as well. For instance, *40% savings on disk drive costs,* when you evaluate on the critical dollar-per-megabyte scale. And *up to 75% on floor space,* because the UP1696 features four times the density of HP disk systems. And today particularly, floor space is just another word for dollars.

MORE RELIABLE, MORE MAINTAINABLE, AND FULLY SUPPORTED.

If there were any advantage in HP3000 users going with HP drives, it would seem to be in the area of service. One name, one place to call in case of problems, right? Well, it's no different with UP. One call to us puts any service problem into one set of very capable hands. Ours. No wrangles. No buck passing.

However, there'll be a lot less service to be concerned about, because the UP1696 is simply *more reliable and more maintainable.* Because the drive is a superior, state-of-the-art product. And the controller, with its low parts count and quality components throughout, means there is less to go wrong. Beyond that, software diagnostics as well as micro-diagnostics insure rapid isolation of problems that do occur.

ABOUT THE FREE PAINT OFFER.

So, okay. If after we've put together a better system to attach to your HP3000, one that delivers more capacity, better overall performance, for less money and in less space, you still want the colors to match, you've got it. We'll send the painter out.

But you'll have to call first.

up
united peripherals
432 Lakeside Drive, Sunnyvale, CA 94086
(408) 730-4440

RXS-11M
ON-SITE COURSES
- MACRO-11 USER
- FORTRAN USER
- SYSTEMS (internals)

Call toll-free for detailed course outlines.
Mini & Micro Educ. Services
(800) 327-9009 ext 265
(From Florida) 702-452-8205

READER COMMENTARY/John N. Krueger

Structured Methods Need Individual Evaluation

We are in a day and age in the data processing industry when many of the myths about "structured methods" should be recognized rather than propagated. Many articles in our industry publications unfortunately foster these misconceptions.

The term "structure" itself is at the root of most of the incongruities. It became a buzzword, for which we have a propensity, and begat a bandwagon approach to its use. Twenty years ago the term itself had no special significance to the DP community. The modern romance with structure began in Europe in the early 1960s where people such as Bohm, Jacopini and Dijkstra developed the basic foundations of structured programming from the mathematical principles of set theory and ordered pairs.

For the interested layman, a clear and concise explanation of these principles can be found in the Auerbach Computer Programming Management set, Structured Programming-Part I (14-03-01). Simply stated, all procedural logic can be expressed in the simple terms of sequence, selection and iteration. The beauty of that is that it is indisputable fact.

Unfortunately, in the remainder of structured plethora, there are precious few indisputable facts. GOTO-less programming, structured Cobol, structured walk-throughs, structured design and analysis and so on are, at best, attempts to extend or prostitute those basic principles. The key here is not to discredit any of those items but rather to realize that they cannot be arbitrarily related because of the use of the term "structure."

For example, walk-throughs are great! However, there is nothing "structured" about them. More aptly stated, they are one of many programmer productivity techniques. Structured design and analysis methodologies no doubt will have a great impact on the industry over the next few years. On the other hand, their guidelines (in fact, basic principles) may vary from one to another and are indeed a departure from the absolute basics of structured programming.

The key to resolving any myths, of course, is knowledge. Each of the so-called structured methods must be evaluated on its own merit and may not relate directly to another. Structured language, or pseudocode, lends itself very well to Pascal or Fortran while not nearly as well to Cobol due to present language constraints. However, the use of a structured charting technique such as Warnier/Orr does a creditable job for Cobol

One item which should certainly be put to bed is that of languages. *Structured programming basics are language independent.* Some languages have constraints which make the adaptation of code from logic harder than others. However, those techniques can be easily mastered unless the organization falls under the "old dog, new trick" syndrome.

Cobol, particularly with its over publicized GOTO-less code and pseudo-nesting problems, is subject to myths all its own. A Cobol program can be well structured and contain no GOTOs or many GOTOs depending on shop standards. Nesting is simply a matter of module management. GOTO-less code and nesting are mostly problems of perception by the uneducated. It should be no surprise that there are excellent structured programs and there are abominations.

In summary, a comprehensive level of knowledge should be achieved about each structured method on an individual basis before making rash decisions about its application. While attaining that knowledge, most organizations could, I'm sure, benefit selectively from the wealth of new technology embedded in "structure."

Krueger is manager, planning and control, for MGIC Investment Corp. in Milwaukee, Wis.

hp
HP 3000 SERIES III
CURRENT INSTRUCTION REGISTER
SYSTEM SWITCH REGISTER
Move ahead with manufacturing software

Engineered Products believes in moving forward.

We are consistently moving forward as the country's leading manufacturer of rack supported warehouses.

Now Engineered Products is breaking new ground with a complete JOB-COST software system for manufacturing industries, utilizing Hewlett-Packard 3000 computer systems.

Internally developed and perfected, our system is now ready for installation at your facility. Designed to provide comprehensive, ON-LINE data processing in • Manufacturing Control/Shop Reporting • Inventory Control • Bill of Materials/Shop Orders • Project Estimating and Job Cost • Raw Materials Distribution • General Ledger and Financial Systems.

Find out more. Send for our brochure or call collect. Ask for our Computer Systems Group.

Engineered Products. We believe in moving forward.

P.O. Box 6767, Greenville, S.C. 29606 Phone (803) 967-7951

Engineered Products

DIABLO 1650 NEW $2,450
w/Platen & Wheel
DIABLO 1640 NEW $2,350
w/Platen & Wheel

— IMMEDIATE DELIVERY —
— 30 DAY WARRANTY —

USED TECHTRAN 815	$495
USED ADM-2	$795
USED ADM-3A	$525
USED LA-36	$995

TBC
TERMINAL BROKERS COMPANY
Box 312 • 37 Franklin Street
Needham, MA 02192
Call (617) 449-0216
Some Items Limited Quantity

NEW from datapro

Directory of Small Computers

Datapro's new, objective directory service to help you save time and money locating, evaluating and selecting small computer systems.

- **System Reports** on more than 200* small computers—prices, specifications, characteristics, options, software—in an easy to compare format.
- **Company profiles,** including product lines, application emphasis, and sales locations, on over 900* suppliers of systems, software, peripherals, maintenance and other services.
- **Twenty-four key application areas** linked to listings of pertinent systems, software, services, reports and profiles.
- **Eight vendor directories** with over 16,000 entries of systems, peripherals, software, services and maintenance companies.

PLUS. . . ● Applications ● Concepts ● Guidelines ● Product Reports ● Personal Computers ● Systems ● Manufacturers & Integrators ● Stores ● Distributors ● Software Vendors ● Peripherals ● Services ● Maintenance Associations ● Clubs ● User Groups ● User Ratings ● Glossary ● Inquiry Service ● Cross Indexed ● Newsletters ● Periodicals. . .all in a quick reference format and non-technical language.

Here's A Sample Of What's Inside. . .

General Index
Your key to fast and easy access to the entire service. Multi level indexing takes you directly to the information you need—by system name, company name, key words, application, report title, section, directory and many other helpful "pointers."

Applications Index
To help you find everything relevant in the service to each of 24 applications areas—(e.g., Manufacturing: all companies, products, services, software, advice, and more.) Included are:

- Accounting
- Banking and Finance
- Computer Management Aids
- Data Communications
- Data Management and Database Management
- Education
- Energy Conservation and Management Systems
- Legal
- Management Sciences
- Manufacturing
- Mathematics and Statistics
- Media
- Medical and Health Care
- Payroll and Personnel
- Sales and Distribution
- Transportation
- Engineering and Scientific
- Entertainment
- Facilities, Security and Protection
- Government
- Insurance
- Word Processing and Text Editing
- General Applications
- Other Applications

User's Guide
A time-saving narrative that quickly familiarizes you with all aspects of the service, summarizes each major section, and helps you get even more for your money.

Inquiry Service
By phone or mail, Datapro analysts are at your service to help with your small computer questions. Convenient mail-in forms are included.

Basic Computer Concepts
The essential components and characteristics of small computer systems are explained, and are conveniently cross-referenced to the Glossary section.

Advice and Guidelines
"How-to" in nature and business-oriented in perspective these Datapro reports will show you:

- How to define and prioritize your basic business functions
- How to identify the costs of your current business information system (automated or manual).
- How to compare your current costs to the costs of new in-house small computer system.
- How to estimate how expensive a system you need.
- How to identify potential computer systems suitable to your business and economic requirements.
- How to evaluate these systems.
- How to determine whether to "make or buy" your software packages.

Personal Computers
Definitions, history, market insights, applications and future trends are summarized to help you better evaluate specific product reports in the service.

Small Computer Systems
Hundreds of brief, easy to read reports on individual small computer systems. Each system report includes:

- A concise summary
  - Current Models
  - Memory
  - Base List Price
  - Typical List Price
  - Primary Uses
  - Popular Options
  - Principal Applications
  - First Shipments
  - Number Installed
  - Availablity
- Background Information
- System Characteristics
- Hardware/Packaging
  - Processor/Memory
  - Display
  - Keyboard
  - Direct Access Storage
  - Printers
  - Data Communications
  - Other I/O
  - I/O Electronics
- Software
  - Languages
  - Operating System
  - Utilities
  - Database Management Systems
  - Communications Support
  - Applications Programs
- Support Services
  - Documentation
  - Support
  - Terms and Conditions

Company Profiles
Uniform, easy to compare descriptions of over 900* companies involved in the manufacture, marketing, and servicing of small computer systems, including peripherals, software, maintenance and others. Included are industry leaders as well as many new, fast-growing entries to this burgeoning industry. Each profile includes:

- Company name
- Address
- Telephone
- Principal business
- President
- Director of Marketing
- Date founded
- Number of employees
- Sales volume
- Primary customers
- Sales concentration
- Product line description

Directories
Extensive listings of the thousands of companies involved with the small computer industry. Full names, addresses and phone numbers are listed alphabetically and by zip code. Cross-referenced to appropriate reports and profiles in the service to help you quickly locate additional information about their products and services. Included are:

Manufacturers/Integrators
- Alphabetical Listing
- Zip Code Listing

System Vendors and Stores
- Alphabetical Listing
- System Listing

System Distributors
- Alphabetical Listing
- System Listing
- Zip Code Listing

Software Vendors
- Alphabetical Listing
- System/Processor Listing
- Zip Code Listing

Peripherals Vendors
- Alphabetical Listing
- Peripheral Type Listing
  - Add-on Memory
  - Cartridge/Cassette Magnetic Tape
  - CRT Display Monitors and Terminals
  - Data Communications Devices
  - Disk Drives
  - Diskette Drives
  - Printers
  - Other Peripherals
- Zip Code Listing

Computer Services Vendors
- Alphabetical Listing
- Zip Code Listing

Maintenance Companies
- Alphabetical Listing
- Zip Code Listing

Other Vendors
- Alphabetical Listing
- Vendor Type Listing
- Zip Code Listing

* Figures change with monthly updates.

datapro
Datapro Research Corporation ☐ 1805 Underwood Blvd.
Delran, NJ 08075 ☐ 609/764/0100

McGraw-Hill

Fact-packed with Hundreds of System Reports and Company Profiles.

Here's a small representative sample of the System Reports and Company Profiles you'll find in the Directory of Small Computers:

System Reports

Apple II, III
Mattel Intellivision
Megatek Whizzard 5000, 7000
NCR 7500, 8100, 8200
North Star Horizon
Ohio Scientific Challenger, I, II, III Series
Point 4 Computer
Qantel 100, 200, 300, & 900 Systems
Radio Shack TRS-80 Model I, II, III
Smoke Signal Broadcasting Chieftain
Texas Instruments DS990, 99/4
Wang 2200 Series
Plus nearly 200 others.

Company Profiles

Basic Four Corp.
Centurion Computer
Cincom System Inc.
Condor Computer Corp.
Cromemco Inc.
Digital Equipment Corp.
Graham-Dorian
Harris Computer Systems
Microsoft
North Star Computers
Ohio Scientific Inc.
Osborne/McGraw-Hill
Radio Shack
The Computer Store, Inc.
Versatec (A Xerox Co.)
Plus nearly 900 others.

Your Subscription Includes All These Important Components

☐ Two loose leaf volumes.
☐ Twelve monthly supplements, up to 90 pages each.
☐ Twelve monthly newsletters.
☐ And Datapro's popular telephone inquiry service.

SAVE 15%

Special Charter Offer Order Without Risk Today!

datapro

☐ Please enter my no-risk subscription to DATAPRO's DIRECTORY OF SMALL COMPUTERS at $280. That's a $50 savings off the regular subscription price of $330. I understand that if for any reason, I am not satisfied with the materials after I receive them, I may return them within 10 days and pay nothing.

DATAPRO RESEARCH CORPORATION
1805 Underwood Boulevard
Delran, New Jersey 08075

Name ______
Title ______
Phone ______
Organization ______
Address ______
City ______
State ______ Zip ______

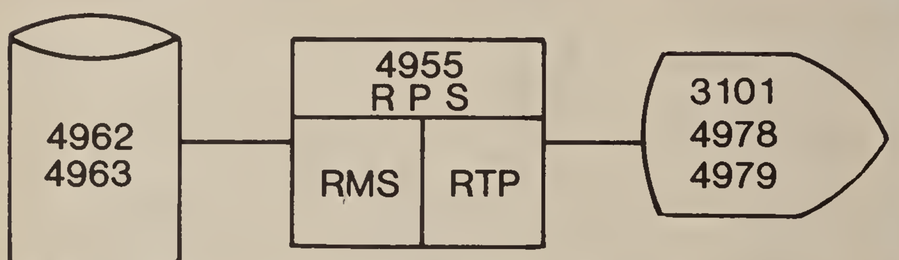
☐ Even though your offer is risk-free, I am not sure yet. Please contact me to provide more information.

SERIES/1

THE PROBLEMS

multiple indexing, disk space management, recovery after system crash, rebuilding index directories, cumbersome file design, programs don't fit, on-line response time is embarrassing, development effort overran budget, terrified of change after application goes into production, the hardware vendor has no convincing answers, trapped by investment in existing code, additional hardware may conceal problems but only good system software can solve them, complaints from users, programmers, upper management, everyone.

THE SOLUTION



For additional information call or write
Colm Kelly or Alex Hill at:
(212) 697-9305

Data Structures
INCORPORATED
122 East 42nd Street. New York. New York 10017

DIABLO®
BRAND
RIBBONS

SPECIAL SALE FOR
NOVEMBER, DECEMBER,
& JANUARY

DIABLO® #40970 HY TYPE II MULTISTRIKE
$43.95 per dozen

DIABLO®
#301980-04 HIGH YIELD HY TYPE II MULTISTRIKE
$47.55 per dozen

QUME® and NEC® Supplies also available.

TERMS: CASH WITH ORDER — 5% DISCOUNT
30 DAYS NET on all approved accounts.
F.O.B. POINT: All orders F.O.B. Shipping point.

D. Owens Associates Inc.
1008 N. Randolph
Arlington, Virginia 22201
800-336-5460

New Safeguards Required

(Continued from Page 43)

signer has to meet both these criteria while being aware that the user is liable to be working with some totally unknown environment, which the application designer cannot influence. This is quite a job.

With this acceptance of possible operating system error, some form of safeguard is included, but the systems buyer often will not see it in the application data.

The type of safeguards currently in use to fulfill such needs are mainly error-detection with an emphasis on the occasional breaches that can result in records or characters being dropped or mishandled in the communications systems.

In ABS, safeguarding systems are built as "pseudo-application programs" which fall under the operating system proper and provide control functions for the payload programs. The system's diagram shows the place where they logically fall.

In addition, control tables that provide for separately programmed handshaking as the records move to and from the application systems are the key, and this appears to be the direction other developers are taking, too.

These developments are important at this stage because of the need to keep the software investment down and to take maximum advantage from the volatile hardware market. Software investment in the past has been related to specific hardware groups — like the IBM 370 and compatibles or the Data General Corp. AOS groupings. This has made software lock-in a problem for any growing installation.

In current usage, the problem of software/hardware lock-in has been particularly strong when new parts of a distributed processing system are being phased in, as use of the operational software in effect restricts the choice of the hardware and prevents the user from taking full advantage of improved hardware offerings.

Rodriguez noted that his firm's precautions may later be proved to have been totally unnecessary, but I doubt this. At the minimum, there are always shakedown problems; with the safeguards, even application directories that have apparently been lost can be recovered.

There is no substitute for being prepared; and when a software supplier is asked to interface to operating systems that can come out of nowhere on the number of types of hardware that are already available, then precautions — even unnecessary ones — are comfortable indeed.

© Copyright 1980 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Sites Ignoring Basics

(Continued from Page 43)

ware resource point of view. What seems to be missing in almost all cases are important operational considerations, considerations that can spell the difference between a workable, effective disaster recovery plan and an ineffective one. Some of these considerations are:

- Off-site storage of critical forms in adequate quantities.
- Transportation facilities.
- Communication facilities between the backup site and the corporate center.
- Housing facilities.
- Disaster recovery organization structure.
- Forms handling equipment.
- Backup site security.
- Periodic testing of power supplies.
- Periodic testing and validation of off-site data.

The preparation of an adequate disaster recovery plan requires a combination of technical expertise, operations know-how and thorough attention to detail. Existing operations must be approached from an audit perspective.

It is clear that to prepare a truly effective disaster recovery plan is a complex, time-consuming task, which, much like documentation, is never complete. Organizations whose operations depend upon the computer must be prepared to deal with the contingencies which could interrupt those operations.

In today's environment the cost of Disaster Preparedness must be considered part of the cost of doing business. Management has a responsibility to be prepared in order to protect the interests of the corporation as well as the individuals who depend upon the corporation for their livelihood and survival.

Sita is a principal with Systems Research Group, Inc., a company in E. Williston, N.Y., that specializes in contingency planning.

Questions on Productivity

(Continued from Page 43)

other match-ups on task assignment/individual GNS. Each match-up requires its own leadership style for enhancing motivation.

The play-on-words heading for this column is more than a jest. Managers have been questioning (investigating) only half of the programming process — the technical side. The other half, the behavioral side, is equally promising.

Improving motivation not only increases productivity, it also reduces turnover. Programmer turnover (34%, according to the most recent *Datamation* survey) is very costly. First, there is replacement cost — recruitment, selection and orientation. Second is the cost associated with the learning curve for bringing personnel up-to-date.

Over the five generations of hardware, Mips rate has increased by a factor of 10 per generation. Programming output has increased less than a factor of 10 during the *entire* five-generation span. Because of the continual increase in labor cost, the cost per instruction has not decreased at all.

Values for the "P" term in the P/C ratio will continue to climb. In order for the "C" side of the ratio to show improvement, managers must place more emphasis on the whole personnel equation — the behavioral as well as the technical.

For Entry-Level Slots

'Grow Your Own Programmers' Advised

By Rita Shoor
CW Staff

CHICAGO — Given the limited resource pool that many organizations have to draw on and the fact that hiring raids on other companies only reshuffle this resource, where does one go to find entry-level programmers? "Grow your own programmers" was the answer from Steven Comstock, a speaker at Advanced Systems, Inc.'s recent Spectrum '80 training conference here.

The technical training specialist listed several additional reasons why a company might opt to train its own programmers:

- Opportunity to tap in-house talent and, in fact, become aware that this talent exists.
- Ability to tailor training to exact organization needs.
- Chance to build company loyalty. The in-house DP staff sees a commitment to their development and employees outside the DP area see a new career path.

Comstock also indicated that entry programmer training could be cost-effective since entry-level salaries range from $10,000 to $18,000, while experienced hires usually draw between $18,000 and $24,000 annually.

'You should be able to train your entry person for less than $2,000 a head.'

He pointed out that many experienced programmers are hired through employment agencies that earn fees for individuals placed. In contrast, "You should be able to train your entry person for less than $2,000 a head," according to Comstock. He qualified this figure by stating that planning time and the salaries for the people who were being trained were not included.

Entry-level training is a four-phase process of planning, selection, training and placement, he said. Planning required agreement at all organizational levels on head count and resources. Then, the curriculum content must be defined. This should include both global and installation-specific DP topics in addition to information about the business and the individual company.

Office space and furniture cannot be forgotten, Comstock pointed out. Finally, a mentor or teacher and appropriate vendors of training materials must be selected.

Selection of the trainees is also a four-step process, he said. There should be an in-house position announcement and advertising when required. Comstock warned the audience to expect the responses to number 10 to 40 times the number of available positions.

Initial Interviews

Initial interviews must then be conducted, in which the interviewer explains what is involved and what will be expected of the trainees. In-depth interviews to discover personal motivation and potential personality conflicts are third on the list. Fourth is the management review step of final applicant selection and followup for everyone who originally applied for the positions.

Training should be mentor-centered, according to Comstock. It should include guest speakers, multimedia instruction, if possible, and on-site class work. He recommended getting trainees into production work as soon as possible in order to familiarize them with working in a real-life environment.

The whole process should take from six to 10 weeks, he claimed. After this, the trainee could work on a programming team for

(Continued on Page 50)

Hierarchical DBMS Geared To Series/1 Users Under EDX

CHICAGO — A hierarchical data base management system for the IBM Series/1 under the EDX operating system is being offered by Unique Information Systems, Inc.

The Data Base Management Executive (DBMX), which utilizes standard EDX files, enables the user to hold, maintain and retrieve all the information needed within one data base, Unique said.

Four data bases can be supported concurrently, each composed of up to 10 record types, each of which is composed on one root segment with a unique key and several trailer segments.

Data is stored in its original size, regardless of EDX physical file blocks. A data base may range over several physical volumes of EDX and a space management mechanism reallocates unused space, the firm said.

A checkpoint-restart mechanism ensures file integrity in case of system failure.

For on-line application development, an interactive data base maintenance and retrieval system, DBMR, is available. Using DBMR, the application programmer may define and create a DBMX data base on a terminal, interactively.

DBMX carries a one-time fee of $10,000. Unique is located in Suite 2900, 30 N. Lasalle, Chicago, Ill. 60602.

Conversion System Links Office System 6, 5110/5120

SAN DIEGO — A conversion system that reportedly provides compatibility between the IBM Office System 6 OSC Information Processor and the IBM 5110/5120 minicomputer has been announced by Chase Enterprises, Inc., along with four business software packages for the 5110/5120.

The 5120/OS6 Conversion System — calling for a 5110/5120 computer with at least 16K bytes of memory — allows data from a 5120 data file to be put into a file job on an OS6 diskette, the vendor said.

In addition, OS6 data can be put on a 5120 diskette. The process runs totally on the computer and reportedly does not require any nonstandard hardware features such as communications interfaces

The four software packages are Medical Accounts Receivable, General Ledger, Payroll and Accounts Receivable.

Medical Accounts Receivable was designed for a 5110/5120 with 32K bytes of memory.

It is a random-access package usable by up to four doctors with a total of 2,800 patients, according to a company spokeswoman. The

(Continued on Page 50)

IBM DOS USERS **BUDGET FOR DOSSIER IN '81**

"DOSSIER is an invaluable tool - I can recommend it to any DOS user who needs a good documentation aid."

"It's a great time saver . . . DOSSIER allows us to enforce standards much more easily."

"DOSSIER provides us with more useful information than any other documentation and standards tool we have tried."

"I am glad I wrote DOSSIER into my budget - it will definitely make 1981 a better year for us."

David Orbaugh, Director of Advanced Systems, Knight Publishing Company, Charlotte, North Carolina

All it took was a free trial to convince David Orbaugh that he needed DOSSIER. "My programmers are most enthusiastic," says Orbaugh. "Once they saw the DOSSIER trial, it was impossible to get it away from them - I had to buy it!"

DOSSIER goes beyond source library documentation to translate object code from program libraries into complete and current program and file information. Its 16 management reports address all aspects of controlling and auditing object libraries.

Try DOSSIER free, without obligation, for 30 days. Discover why more than 600 companies are already using DOSSIER to upgrade, maintain, audit and clean up DOS, DOS/VS and DOS/VSE libraries.

For more information, just clip this coupon and mail to Computer Concepts, Inc., 6443 S.W. Beaverton Highway, Portland, OR 97221. Or Call 503/297-4741.

Send me more information about DOSSIER

Name

Company

Address

City

State/Zip

Telephone number

DOSSIER™
Documentation & Standards Tool
a product of
CCI

DBMS Updates IDMS Tool

LOMBARD, Ill. — DBMS, Inc. has announced Release 2 of its IDMS Journal Analyzer system, said to feature a chronological event report, abort coincidence analysis and documentation update.

The chronological event report details by time all activities within the IDMS central version, according to the firm.

The documentation update reportedly simplifies the problem-analysis procedures that a data base administrator uses to isolate transactions for review.

Release 2 costs $7,500 from the firm at 33 W. Roosevelt Road, Lombard, Ill. 60148.

Genasys Backs DBMS, IBM 3800

NEW YORK — Release 3.07 of Genasys International, Inc.'s application system development software adds support for data base management systems (DBMS) and the IBM 3800 laser printer.

Release 3.07 extends the maximum size of an overall data base definition and expands support for Segment Search Arguments (SSA) under IBM's Information Management Systems (IMS).

The update also includes enhancements to the vendor's support of IDMS from Cullinane Corp., Adabas from Software AG, DMS-II from Burroughs Corp. and Image from Hewlett-Packard Co.

Other changes optionally allow Isam-type, in addition to sequential, files to have records located in the file definition area instead of working storage. The release also allows the user to code a condition that suppresses all verification for a file or a CRT terminal screen display that is being edited, the vendor claimed.

Recognition of common patterns in program logic has been carried further in Release 3.07 with the inclusion of an enhanced prototype of file maintenance logic, the vendor claimed. Common data needs are supported by more patterns of dates for testing and other functions, as well as an additional print format for telephone numbers.

The basic Genasys software can be licensed for $100,000. Depending on configurations, the price can rise to $175,000, the vendor said from 17 E. 45th Street, New York, N.Y. 10017.

Growing Your Own Advised

(Continued from Page 49)

some six to nine months and then might be classified as an experienced programmer.

Placement of the trainee involves student evaluation, which should be completely honest, and team or project assignment. The trainer must be prepared to handle the person who does not successfully complete the course. If that person was an in-house transfer, the organization will usually try to find another position within the company; if it was a new hire, the rejected trainee usually goes "back on the street," Comstock said.

Finally, he recommended placing the trainee on development rather than maintenance teams. After teaching the group new techniques, it is better not to expose them to "bad habits" or inefficient programming logic structures, he said.

Other possibilities that should be considered are cooperative internship programs with neighboring colleges and consortium training, which involves several companies combining their training resources. However he warned that organizational differences often have a negative impact on consortium training.

System Links OS6, 5110/5120

(Continued from Page 49)

base system may also be expanded.

The system is capable of producing monthly statements, standard insurance forms, Medi-Cal and Medi-Care insurance forms. While the monthly balance forward accounting method is utilized, detailed transactions may be saved for more than a month for selected patients.

The General Ledger multiple entity system needs at least 16K bytes of memory and supports up to nine different Charts of Account. Different entities have different fiscal-year starting months, the spokeswoman explained.

The Payroll system provides for multiple entities and integrates with the General Ledger system, according to the spokeswoman. Monthly, quarterly and yearly reporting is done by company and the system consolidates companies for reporting purposes.

The Accounts Receivable system is said to allow processing of accounts receivable, inventory control and order entry. Open item and balance forward systems are available.

The 5120/OS6 Conversion System costs $800; the Medical Accounts Receivable system costs $4,000; General Ledger costs $1,500; Payroll costs $1,500; and Accounts Receivable is available for $5,000; all may be obtained from the company at Suite 202, 8334 Clairemont Mesa Blvd., San Diego, Calif. 92111.

IBM 3276-2 CONTROL UNIT DISPLAY STATION COMPATIBLE
DM3270 only $2395!

COSTS 40% LESS than a comparable IBM unit, therefore, significantly contributing to an overall *lower cost of ownership.*

ECONOMICAL COMPUTER POWER available at locations never before possible. The DM3270 is designed to satisfy requirements for single station stand-alone applications.

COMPACT — 30% SMALLER than the IBM 3270 display station. However, the esthetically designed package maintains a *large anti-glare display screen.*

ADDITIONAL SAVINGS via INCREASED THROUGHPUT. The DM3270 offers concurrent keyboard/display and printer operation. A unique *double buffering scheme* is utilized by the terminal which ensures *continuous page printing.*

ENHANCED PRINTER SUPPORT. The printer is viewed by the mainframe as an IBM 3287, however, the DM3270 provides the system interface allowing utilization of a *low cost non-buffered serial printer.*

BINARY SYNCHRONOUS COMMUNICATIONS (BSC). The unit supports all procedures and concepts with EBCDIC codes and data link communications applicable to the IBM 3276-2.

EXTENDED ATTRIBUTES IBM 3279 compatible — reverse video, field blink and underline.

ADDITIONAL FEATURES include line drawing capability, self diagnostics, a line monitor mode, and 12 key numeric pad.

PROVEN WORLDWIDE. The DM3270 is the newest addition to the *industry standard DM series* of smart terminals.

Call today for demonstration scheduling *TOLL FREE in USA* **(800) 453-9454**

BEEHIVE INTERNATIONAL

"A proven competitive manufacturer of smart terminals"

CALIFORNIA Costa Mesa *(714) 540-8404* • Sunnyvale *(408) 738-1560* **FLORIDA** Altamonte Springs *(305) 830-4666*
ILLINOIS Arlington Heights *(312) 593-1565* **MASSACHUSETTS** Woburn *(617) 933-0202* **NEW YORK** New York
(212) 682-2760 **UTAH** Salt Lake City *(801) 355-6000* **WASHINGTON, D.C.** (VA) Falls Church *(703) 356-5133*
EUROPE The Netherlands *Phone 020-451522*

“Here are four reasons why we switched to NCR,” says Dale A. Dooley of the Iowa Transfer System.

Dale A. Dooley (left) is executive director of Iowa Transfer System, Inc., in Des Moines. Jim Schulte is NCR district manager.

DOOLEY:
The Iowa Transfer System is the first electronic funds transfer system to operate statewide. Over 85 percent of the commercial banks in Iowa are supporting members. We recently installed an NCR 8450 as the central element — the switch — in our network.

NCR's SCHULTE:
It's the element that makes the remote connections, so that every terminal has access to every bank on the network. All across the state of Iowa.

DOOLEY:
Our first reason for going to NCR is monetary. With NCR, our costs are substantially lower than under our previous arrangement.

NCR's SCHULTE:
And at least a bit lower than the other alternatives you explored.

DOOLEY:
Then there is the support we received from NCR and from you, Jim. And NCR's known commitment to EFT.

NCR's SCHULTE:
NCR representatives are specialized. All the people in my group work exclusively with financial institutions. So we are in tune with current financial trends. Other NCR representatives have parallel specialties so they can be more responsive to the problems peculiar to their industries. It's a concept that is working well for us.

DOOLEY:
The third reason is software. Only NCR could provide the switch software we needed when we had to have it.

NCR's SCHULTE:
Not only did we meet the deadline, but the transition to our system was very smooth.

DOOLEY:
Finally, our decision was influenced by the dependable performance of the other NCR systems within the network. And we have had the same experience with this system. Our uptime level has been very high — a critical consideration when you're talking about a network switch.

In the NCR office nearest you, there is an account manager like Jim Schulte who specializes in your industry and knows NCR systems. Learn how an NCR system can help you. Phone him at the local office. Or write to EDP Systems. NCR Corporation, Box 606, Dayton, Ohio 45401.

NCR
Complete Computer Systems

COMPUTER CUM LAUDE.

At Oakland University, our Level 68/DPS is used for everything but French Club breakfasts.

Michigan's Oakland University wanted its computer system to be open to everyone–particularly students.

So they installed our Level 68/DPS.

Equipped with a powerful Multics operating system, the computer is available to students 16 hours a day.

And not just computer students.

A large percentage of *all* Oakland students use the system in their course work.

Processing power can be tapped right in the classroom. Or through more than 70 terminals scattered across campus.

The system is easy to use. And its applications are many. Students and faculty use it to aid in research and simulation. To prepare theses. And to organize information.

Because the Level 68/DPS is an interactive system, administrators and secretaries can also benefit by it.

Naturally, with so many people using the computer, security is essential.

But thanks to extensive safeguards built into the Multics operating system, security can be maintained without lessening the computer's availability.

All in all, Oakland's Level 68/DPS is working out very well.

Most Oakland students will graduate with the ability to use a computer. A necessary skill in our increasingly technological society.

There's a lesson here.

What could be more appropriate for *any* university than distributed computer power that's easily accessible and easy to use?

For more information on the Level 68/DPS and the Multics operating system, write Honeywell, 200 Smith Street (MS 487) Waltham, Massachusetts 02154.

Honeywell

Series/1 Gets Ansi Cobol

TUSTIN, Calif. — A 1974 Ansi Level 2 Cobol system is now available from Royal International Software Systems for the IBM Series/1 minicomputer running under EDX.

The Cobol system supports the Level 2 features of Nucleus, Table Handling, Sequential I-O, Relative I-O, Index I-O, Sort-Merge, Segmentation, Library, Inter-Program Communication and Ansi Debugging.

The system also supports a Report Writer; Packed Decimal, which eliminates the conversion effort from existing IBM Cobol programs; and Screen Handling, according to Royal.

The compiler will compile with 32K bytes of main memory at 400- to 600 lines/min depending on the listing options requested, Royal said.

The software costs $8,700 per CPU for compiler and run-time library and $3,480 per CPU for run-time library only. The price includes maintenance and future enhancements, the vendor said from Suite 206, 202 Fashion Lane, Tustin, Calif. 92680.

MTM Utilities Fit Series/1 Use

WAKEFIELD, Mass. — Four Multiple Terminal Manager (MTM) utilities for IBM Series/1 users operating under EDX are available from Wakefield Software Systems, Inc.

The utilities are:

- The Batch Job Invoker, which allows a program under MTM control to load a sort, job utility or program to another partition as a batch job that is not running under MTM control. It costs $160.
- The MTM Menu Processor, which allows the creation of menus using $Image screens. These menus can describe a string of up to 20 programs to be run sequentially from any one menu item, the vendor claimed. The Menu Processor costs $200.
- An Automatic Diskette Varyon, which allows a program running under MTM control to vary on a diskette. It costs $60.
- A Utility Processor which permits a program running under MTM control to invoke any EDX utility in another partition and pass the parameters required by that utility. It also costs $60.

Wakefield Software Systems is located at 28D Vernon St., Wakefield, Mass. 01880.

Accountants, Lawyers Get Staff Scheduling

ATLANTA — Management Control Systems, Inc. (MCS), a producer of software systems for CPA and accounting firms, has released the Staff Scheduling System to be run on IBM System/34 computers.

Designed for scheduling employees in accounting and law firms, the system can save professional time by matching employee availability with client requirements, according to MCS. Firms of this type can use the system to plan, schedule, monitor and evaluate optimal schedules.

Priced at $2,500, the system can be obtained from MCS at 2111 Powers Ferry Road, Atlanta, Ga. 30309.

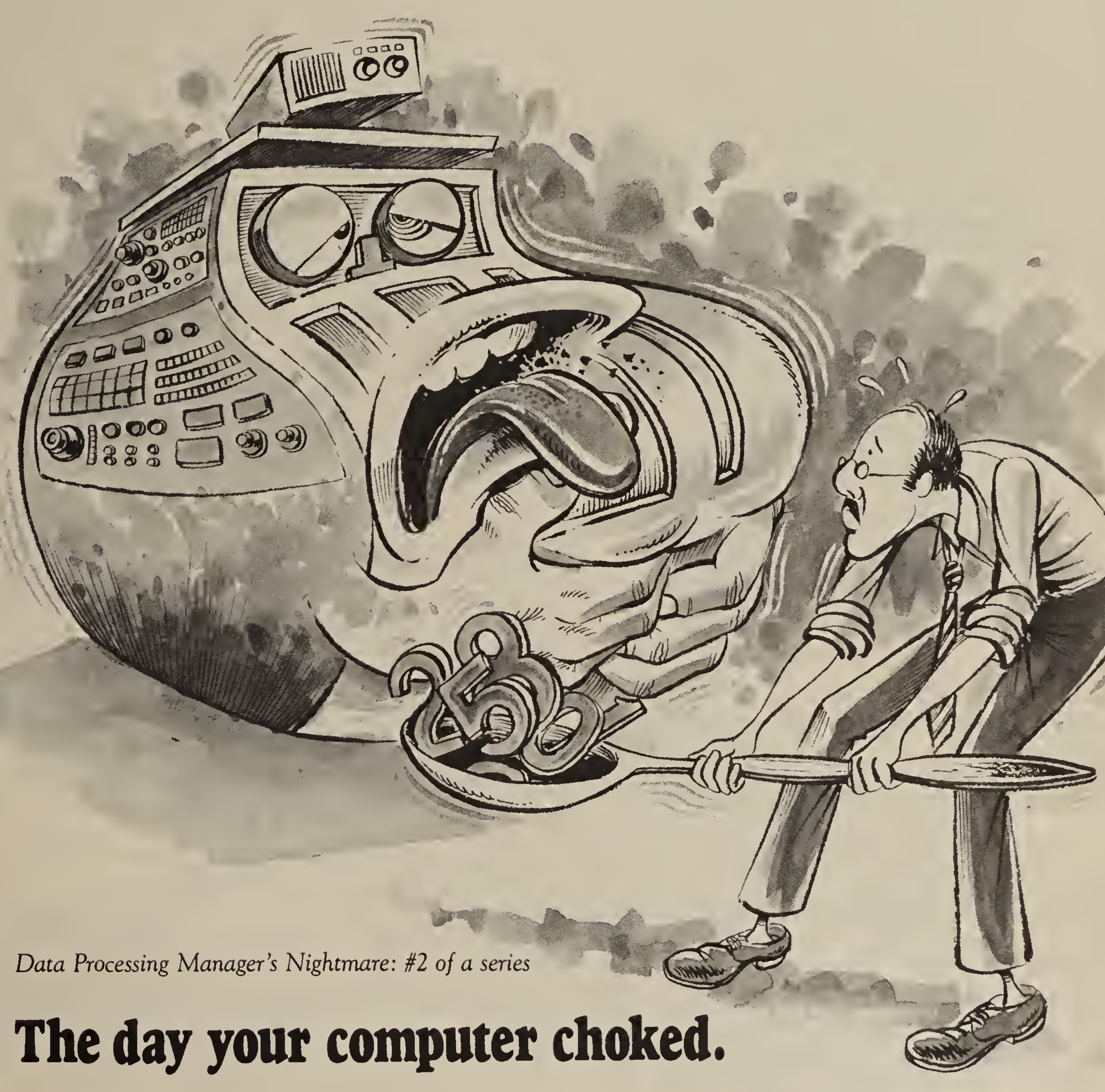
In Various Cities

Course Series Slated for CICS, Vsam Users

RIVER EDGE, N.J. — A series of courses for users of IBM's CICS and Vsam has been scheduled by On Line Software International:

- **CICS/VS Application Programming,** (Command Level), five days, $700. It will be given Dec. 1-5 in San Francisco; Jan. 19-23, Dallas; Feb. 23-27, New York; March 30-April 3, Los Angeles; May 4-8, Chicago; and June 8-12, New York.
- **CICS/VS Application Programming,** Macro Level, five days, $700. It will be given Dec. 8-12 in San Francisco; Jan. 26-30, Dallas; March 23-27, Los Angeles; May 11-15, Chicago; and June 15-19, New York.
- **CICS/VS Logic and Debugging,** four days, $600. To be given Nov. 17-20, New York; Feb. 10-13, Houston; April 6-9, San Francisco; March 11-14, New York; and June 22-25, Chicago.
- **CICS/VS Internals,** five days, $700. This workshop examines program structures. It will be given Dec. 1-5, San Francisco; Jan. 19-23, New Orleans; March 2-6, New York; April 6-10, Minneapolis; May 11-15, Los Angeles; and June 22-26, New York.
- **CICS/VS Performance and Tuning,** a two-day, $300 course. This course will be given Dec. 8-9, San Francisco; Jan. 26-27, New Orleans; March 9-10, New York; and May 18-19, Los Angeles.
- **Recovery/Restart,** $300, two days. To be given Dec. 10-11, San Francisco; Jan. 28-29, New Orleans; March 11-2, New York; and May 20-21, Los Angeles.
- **Vsam: Its Structure and How To Use It,** $600 for four days. To be given Dec. 15-18, New York; Feb. 10-13, San Francisco; March 30-April 2, Dallas; May 4-7, New York and June 22-25, Minneapolis.
- **CICS/VS Application Design,** four days, $600. It is scheduled for Dec. 8-11 in New York; Jan. 26-29, San Francisco; March 9-12, Minneapolis; April 13-16, New York; May 18-21, Houston; and June 29-July 2, New York.

Registration forms are available from On Line Software International at 65 Rt. 4 East, River Edge, N.J. 07661.



Data Processing Manager's Nightmare: #2 of a series

The day your computer choked.

The input was too much to swallow. Bit by byte the capacity of your equipment was exhausted and by now, so are you. Maybe it's time to replace that computer with a larger one. . .maybe not.

We can show you a similar case where, by designing a new component, we increased the capacity of our client's existing equipment. Or, if necessary, we can acquire the new equipment you may need under an attractive lease arrangement and re-market your present machines.

We're F/S Computer Corp., a total asset management company. We do more than just leasing. Our technical depth and worldwide marketing capabilities can maximize your equipment investment and our parent's massive financial resources assure success.

Currently, we manage over $400 million in central processors, related peripherals and electronic business equipment.

So, wake up to F/S Computer. Call Jim Hartnett, vice president-general manager, and trade your nightmare for a pleasant reality.

F/S Computer Corp.

One of the Asset Management companies of **FSC Corporation**

1000 RIDC Plaza, Pittsburgh, PA. 15238
(800) 243-5046
In Conn. call (203) 226-8544

FSC Corporation is a publicly owned, diversified enterprise actively engaged in manufacturing and distribution worldwide of equipment and chemical products for industry; refining crude oil for jet fuel, naphtha and fuel oils; selling and servicing cost effective electronic telephone systems for business and government; and management of over $750 million worth of assets with long term income-producing values including railroad freight cars, aircraft and high technology equipment.

Minimal Basic, Fortran Approved as Fips

WASHINGTON, D.C. — Federal Information Processing Standards (Fips) for Minimal Basic and Fortran have been approved by Secretary of Commerce Philip M. Klutznick.

The Minimal Basic and Fortran standards, Fips 68 and 69, are now added to the previously approved standard Cobol as the high-level programming languages adopted for federal government use. The Commerce Department's National Bureau of Standards was actively involved in the development of the standards by voluntary groups under the auspices of the American National Standards Institute and recommended their adoption as federal standards.

Minimal Basic and Fortran language processors developed or acquired by federal agencies on or after Sept. 4, the effective data of Fips 68 and 69, must conform to the standards.

The two Fips, including associated ANS documents, are expected to be available sometime this month, according to a spokesman at the National Bureau of Standards, who estimated Fips 68 will cost $7 and Fips 69, $16.50.

They can be ordered from the National Technical Information Service, Springfield, Va. 22161.

Runs on System 80

Univac Gets 'Unisdis-Wholesale'

BLUE BELL, Pa. — Unidis-Wholesale, an application package for the distribution industry, will be available on the Univac System 80 this month.

A fully integrated, on-line interactive system that can be used in wholesale warehouse operations, the package provides order entry, stock control and scientific inventory management, the vendor said. The overall system can interpret how the orders will be priced, filled, shipped and how stocks will be affected.

It can also create purchase orders instantly, validate and control the receipt and movement of goods, update inventory records and generate account transactions.

Demand Forecasts

Unidis-Wholesale performs demand forecasting, with model selection and monitoring, purchasing parameter calculation and review, strategy simulation and stock analysis and reporting.

The minimum System 80 configuration required to support the software is a Model 3 or Model 5 CPU with 524K bytes of main memory and two disk drives, one diskette, one workstation and one printer with 64-char. print band. It is also available on the Univac 90/30 and 90/40 computer systems.

The software license fee for Unidis-Wholesale is $420/mo. for Order Entry/Stock Control and $420/mo. for Inventory Management, including support. Univac can be reached through P.O. Box 500, Blue Bell, Pa. 09424.

Unis 1100 Update Interactive

BLUE BELL, Pa. — Univac has announced an enhanced interactive version of Unis 1100, the package for manufacturing management control on Univac's 1100 series mainframes.

The enhanced Unis 1100 allows manufacturing people to load their own data and then call it up via simple English commands, update immediately and have it displayed on a terminal screen or call for hard-copy printouts as needed, a Univac spokesman said.

Interactive Functions

The interactive functions of Unis 1100 share data through a common data base.

Capabilities include production engineering data management, product costing, customer order processing, purchase-order control, inventory status and control, forecasting and analysis, master scheduling, material requirements planning, production planning and work order control, a Univac spokesman explained.

Monthly charges for Interactive Unis 1100 range from $600 to $1,500 depending on the manufacturing functions being used.

First customer deliveries are scheduled this month, a spokesman said.

Industrial Engineer Tools Out

PARAMUS, N.J. — Four industrial engineering software packages in use in the UK and Europe have been introduced into the U.S. market by the American subsidiary of Compeda Ltd. of Britain.

The four packages are Sammie, Sword, Timelink and Nulisp. Sammie is a computer-aided design system that enables the human form to be modeled three-dimensionally, then moved about to evaluate the physical interaction between man and the workplace or work task.

Sword is a workshop scheduling package that aims to provide the optimum allocation of work between man and machines. It is designed for volumes of up to 10,000 operations.

Timelink is a system for the management of all aspects of an organization's work-study activities. It can provide automatic transfer of relevant data to other company systems such as production control.

Nulisp is said to be a suite of programs that complements Timelink and helps the industrial engineer produce a breakdown of a complete assembly process into stations whose work content is balanced among operators.

The packages are available on three-year licenses, including warranty, maintenance and system upgrades during that time. At the expiration of the 3-year period, the user has perpetual use of the package and can buy updates at preferential rates. The one-time cost for Sammie is $120,000; Sword, $25,000; Timelink, $90,000; and Nulisp, $36,000.

Compeda, Inc. is located at Paramus Plaza I, 140 Rt. 17 North, Paramus, N.J. 07652.

McAuto Has 'Caposs-E' Programs

ST. LOUIS — McDonnell Douglas Automation Co. has developed three on-line modularized transaction programs for integration into the IBM Caposs-E release.

Available to installations that operate under OS or VS with the IMS data base management system and also to customers who process through McAuto's data communications network, the programs are contained in three separate modules.

Executive Module

The Executive module was designed to improve standard reports, the Order Status module allows planners to inquire about work process and the Process and Routing module allows planning engineers to maintain instructions on the manufacturing process, according to McAuto.

The prices for McAuto's modules licensed separately are: Executive, $35,000; Order Status, $60,000; and Process and Routing, $40,000. The combined price is $115,000.

More details are available from McAuto, St. Louis, Mo. 63166.

'Profit Control' Systems Support Sentinel Minis

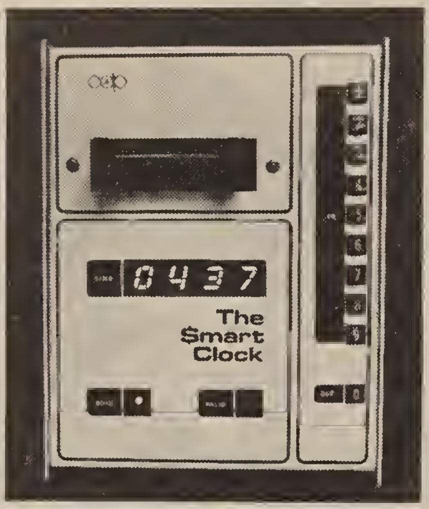
CINCINNATI — An integrated set of financial and distribution application software systems called Profit Control is available from Sentinel Computer Corp.

The product is designed to be compatible with the vendor's Database capability, which is offered on its microprocessor-based minicomputers.

The software includes the "Company Profile" concept, which provides for all master control information to be stored and maintained in a common file to facilitate modification without the need for reprogramming, the vendor claimed.

The hardware and software together cost between $30,000 and $100,000, the vendor said from 9902 Carver Road, Cincinnati, Ohio 45242.

$mart Clock
The Leader in Stand Alone Data Collection Terminals



Data Collection For . . .
- PAYROLL
- INVENTORY
- JOB COSTING
- SECURITY ACCESS

AND OTHER CUSTOM APPLICATIONS

cdp coastal data products inc.
7370 N.W. 36 Avenue/Miami, Florida 33147
(305) 696-6800

charge!

Get off the routing list and on to the subscriber list. Just take out your American Express, Master Charge or Visa card, find the subscription form bound into this issue, and CHARGE!

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

'FCS-EPS' Ready On DEC

CHICAGO — EPS, Inc. has unveiled a financial evaluation and planning system for use on Digital Equipment Corp. Decsystem-10, Decsystem-20 and PDP-11/70 CPUs.

The FCS-EPS package performs statistical, risk and financial analysis in a three-dimensional mode that can work models and scenarios into a complete hierarchical consolidation structure and allow the user to plug in variables for what-if analysis, the vendor claimed.

The system currently runs on IBM, Honeywell, Inc., Burroughs Corp., Univac, Hewlett-Packard Co., Data General Corp. and Amdahl Corp. systems.

The system costs $20,000 to $50,000, depending on CPU configuration, EPS said from 8600 W. Bryn Mawr Ave., Chicago, Ill. 60631.

PDS Offers Library Set

CARSON, Calif. — Pacific Datasystems, Inc. (PDS) is offering a set of library procedures and utilities to provide support software for the implementation of business applications packages.

The Pascal Applications Support Software (Pass) runs under the RT-11 operating system for the Digital Equipment Corp. PDP-11, the vendor explained.

However, the procedures are written in Pascal and are transportable to other Pascal systems, the vendor said.

The package is priced from $3,000 to $6,000 depending on user requirements. PDS can be reached through P.O. Box 5369, Carson, Calif. 90749.

'Wafe' Text Editor Adjunct To DPD Word-11 Package

PLACENTIA, Calif. — A full-screen text file editor called Wafe has been released by Data Processing Design, Inc. (DPD) as an adjunct to its Word-11 multiuser word processing package.

Word-11 enables users of Digital Equipment Corp.'s PDP-11 systems operating under RSTS/E to run extensive word processing tasks concurrently with DP operations, Data Processing Design said.

Originally developed for internal use, Wafe adds to programmer efficiency, resulting in faster training and savings in system resources, the vendor claimed. Benchmarks are currently being developed and will be available at no charge.

The Wafe package costs $1,500 from the vendor at Suite F, 181 W. Orangethorpe Ave., Placentia, Calif. 92670.

Tool Lets Terminal Handle Up to Four Job Streams

BEDFORD, Mass. — A single data terminal in a Digital Equipment Corp. PDP-11 or VAX-11/780 configuration reportedly can do the job of four interactive terminals with a software package released by Clyde Digital Systems.

A terminal supporting either family of DEC hosts can handle alternately up to four job streams, a spokesman explained, without interrupting the interactive mode.

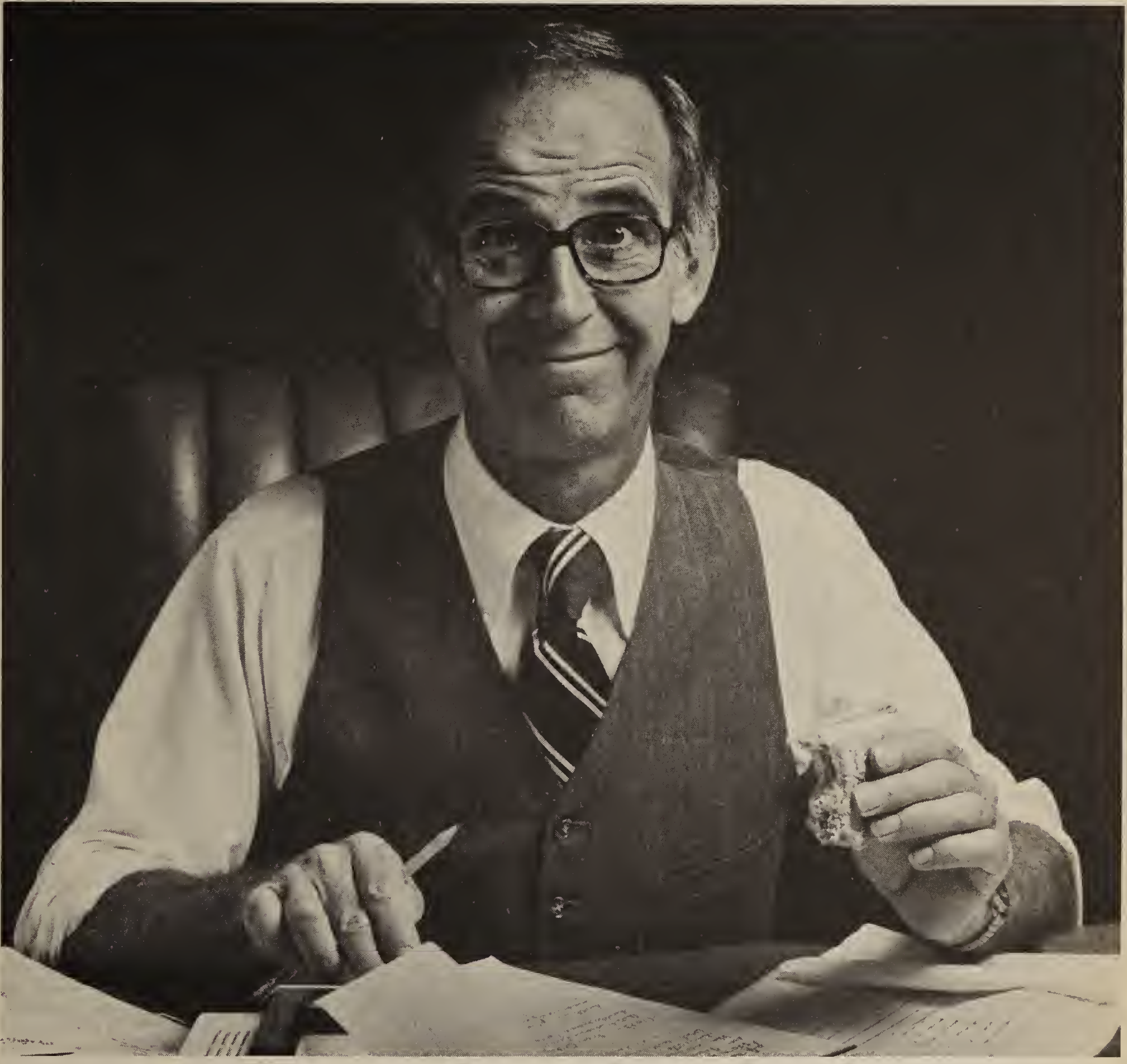
Keystrokes entered by the user and data presented to the terminal are captured in a log file, the spokesman added.

The package costs $195 from Clyde Digital through P.O. Box 348, Bedford, Mass. 01730.

PLAN FOR DISASTER.

A computer disaster plan can be essential to the survival of your business. Disaster Plan/80 provides you with a well thought-out model and specific procedures to follow in developing, testing, and maintaining an effective disaster recovery plan for your company. Call or write today for details.

EDP SECURITY, INC.
The contingency planning specialists
400-2 Totten Pond Road
Waltham, MA 02154
(617) 890-6466



Our users save over $1,000,000 a month.

The SHRINK/2 file compression systems reduce the volume of data on disks and tapes by as much as 80% for users of OS 360/370 and compatible systems.

A software solution to a hardware problem. File sizes can be enlarged without adding more spindles.

Existing spindles are freed up for new applications.

That can mean enormous savings in capital outlays for hardware.

Not to mention the savings on enlarged computer rooms, cooling requirements and other related costs.

And compressed files are made secure through encryption at no extra cost.

We also offer another version, SHRINK/IMS, designed for IMS/VS data bases. It's totally transparent to IMS application programs; the programmer never even knows it's there. And its compression is selective for maximum performance.

Why not help yourself to more file capacity from your present hardware and to big savings. Call, send the reply form below, write on your letterhead, or just attach your business card to the coupon.

21050 Vanowen Street, Canoga Park, California 91304
Tim Corey, Product Manager (213) 887-9121
Telex 69-8715 Cable INFORMATIC

informatics inc®

☐ Send me information about SHRINK/2
☐ Send me information about SHRINK/IMS
☐ Send me a salesman with an order form

8-CW-12180

Name________ Title________
Company________ Tel. ( ) ________ Ext. ________
Address________
City________ State________ Zip________
CPU________ Op. System________ Disk: Model________ Quan.________

SHRINK® Software by Informatics.
The Information Management Company.

Tool Lets NCR VRX Machines Run Imos, IRX Applications

PLEASANT HILL, Calif. — Ibos/5, a comprehensive implementation tool that allows NCR Corp. Imos and IRX applications to run on that vendor's VRX machines, has been released by Century Analysis, Inc.

Ibos/5 was designed to enable VRX users to take advantage of the interactive applications developed for the I-Series user, as well as to enable I-Series users to migrate into the VRX environment.

In both instances, Century's teleprocessing monitor, Boss/3, can be used concurrently, a spokesman noted.

Background Jobs

Ibos/5 allows each individual terminal to continue on-line processing after one or multiple background jobs are initiated.

In addition, Ibos/5 supports menu and control string functions and, because of its self-documenting feature, provides an audit trial of Imos program modifications, the vendor noted.

Ibos/5 can be implemented on any NCR Criterion using the VRX operating system. It can run as a stand-alone system or as a feature under the Boss/3 teleprocessing monitor.

It is priced at $8,000 for the stand-alone version and $3,000 for use with Boss/3.

Century Analysis is located at 114 Center Ave., Pacheco, Calif. 94553.

'Structure(s)' Updated For Warnier-Orr Diagrams

TOPEKA, Kan. — Version 3.0 of Structure(s), a software package that automates the production and maintenance of Warnier-Orr diagrams, has been released by Langston Kitch & Associates, Inc.

Structure(s) is used to aid the analyst, designer and programmer with the design, construction, maintenance and documentation of systems.

The latest version offers the addition of conditionals to the diagram, more user-specified options, improved error handling, support for IBM laser printers and for asynchronous terminals and new support material, a company spokesman explained.

Structure(s) is available in IBM FCobol. Source code is provided and can be modified to run on most machines having Cobol compiler, the firm said.

Structure(s) costs $9,900 or $600/mo to lease, but will be increasing in sale price to $11,500 as of Jan. 15.

The vendor is located at 715 E. 8th St., Topeka, Kan. 66607.

Tool Creates Formats

PHOENIX — Database Systems Corp. has announced a software programming tool for users of Prime Computer Corp. minicomputers.

The Dataforms package offers a method of creating and maintaining CRT terminal screen formats for user applications, Database said.

Features include range check, table look-up, modulus, data types and computed values, the vendor said.

Dataforms includes a run-time library of calls that can be invoked from Cobol, Fortran, PL/I or other languages supporting external calls.

The package supports block mode terminals and is priced at $7,500.

Database is at Suite 710, 5251 N. 16 St., Phoenix, Ariz. 85016.

Expandable Job Cost Set Designed for HP 3000

LONG BEACH, Calif. — A Job Cost Processing package that offers a set of Cobol programs designed to be modified and expanded to meet user requirements is now available for the Hewlett-Packard Co. HP 3000 computer.

Data Systems for Industry, Inc.'s JCP is dependent upon the prior installation of HP's Materials Management/3000.

JCP utilizes the HP Image data base and V/3000 terminal control program.

The fill-in-the-form data entry screens collect labor distribution records, which are accumulated against a work order.

A detailed actual cost vs. standard cost variance report is then produced and a cost summary record is generated for historical summary reporting.

Shop Floor Model

In addition, JCP was designed to supplement a previously released Shop Floor Processing Model.

JCP is available with source code and system documentation for $10,000 from Data Systems for Industry, 3450 East Spring St., Long Beach, Calif. 90806.

Data Capture Package Supports HP Terminals

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a data capture package that supports three of its terminal models recently added to the HP 1000 computer system.

Datacap/1000-II's menu-driven format reduces the time and cost required to design, install and maintain a real-time data capture system by minimizing the user's programming effort, the vendor claimed.

Up to 56 HP data-capture terminals with various configurations can be linked to the 1000 computer and managed by Datacap/1000-II, a spokesman said.

Datacap/1000-II is priced at $5,000.

HP is headquartered at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Micro Notes

Plotting Graphs for Line Printer, Active Filter Design, Descriptive Statistics & Regression Analysis, Electronics I and **Electronics II** are software programs designed for the TRS-80. Price range: $16.95 to $21.95. Vendor: Howard W. Sams & Co., Inc., 4300 W. 62nd St., Indianapolis, Inc. 46268.

Version 4.0 of Cobol-80 is available from Microsoft for 8080, 8085 and Z80 users. Price: $750 ($20 for documentation). Vendor: Microsoft, Suite 819, 10800 N.E. Eighth, Bellevue, Wash. 98004.

CP/M-86 from Digital Research, Inc. is an operating system for the Intel Corp.'s 8086/8088-based micros. Price: $300. Vendor: Digital Research, Inc., P.O. Box 579, 801 Lighthouse Ave., Pacific Grove, Calif. 93950.

The **Order Scheduler** maintains up-to-date purchase order information on the Apple Computer, Inc. Apple II. Price: $150. Vendor: High Technology, Inc., 8001 N. Classen Blvd., P.O. Box 14665, Oklahoma City, Okla. 73113.

RCS the Micro-Modeler is a financial modeling package, written in Pascal, which runs on Apple Computer, Inc. MPUs. Price: $1,500. Vendor: Ferox Microsystems, Inc., 5881 Leesburg Pike, Falls Church, Va. 22041.

The Assistant Principal is an administration package for high schools and junior high schools that runs on the Apple Computer, Inc. Apple. It requires two disk-drives and Applesoft in random-only memory. Price: $500. Vendor: Monument Computer Service, P.O. Box 603, Village Data Center, Joshua Tree, Calif. 92284.

Business Package V handles patient records, appointement scheduling, billing, insurance claims, bookkeeping and analysis for the medical professional, on Apple Computer, Inc.'s Apple computer. Price: $450. Vendor: Compusoco, P.O. Box 2325, 25251 Via Roble, Mission Viejo, Calif. 92690.

RCS-The Micro-Modeler is a full-scale financial modeling package written in Pascal that runs on Apple Computer, Inc.'s Apple II. Price: $1500. Vendor: Ferox Microsystems, Inc., 5881 Leesburg Pike, Falls Church, Va. 22041.

CP/Modem expands the communications capabilities of CP/M-based computer systems, with both high and low protocols, on Digital Equipment Corp. systems. Price: $300. Vendor: Information Engineering, Box 305, 8 Bay Rd., Newmarket, N.H. 03857.

Dental Office Management is an appointment scheduling, billing and insurance form preparation package that operates on Apple Computer, Inc.'s Apple II system. Price: $359.95. Vendor: Charles Mann & Assoc., Micro Software Division, 7594 San Remo Trail, Yucca Valley, Calif. 92284.

Data Base Focus is the name of Micro Data Base Systems, Inc.'s newsletter on micro product development and applications. Price: $1. Vendor: Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, Ind. 47902.

Have a DEC-20 or DEC-10?

You need the *complete* RELATIONAL DBMS.

DPL

Send for more information now.

NATIONAL
INFORMATION
SYSTEMS, INC.
20370 TOWN CENTER LANE • 245
CUPERTINO, CA 95014
(408) 257-7700

Name ____________
Company ____________
Address ____________
____
____
Phone ____________ **CPU** ______

What it means to be the worldwide leader in IBM-compatible computers.

At National Advanced Systems, we offer the broadest range of IBM-compatible computers on the market. Our systems have met with unprecedented customer acceptance. In fact, we now have the largest installed base in the entire industry.

This leadership position isn't one we take lightly. We've dedicated ourselves to providing complete data processing solutions which help decrease your cost of doing business. And that's especially important in these times of recession, inflation, and high interest rates.

Why compatibility?

The concept of compatibility has allowed manufacturers such as ourselves to provide superior price/performance alternatives to IBM users. As a result, the IBM-compatible segment is now growing twice as fast as the rest of the data processing industry. And we're committed to remaining at the forefront with all the necessary services and technological advances, because we understand your need to increase productivity while protecting your investments in IBM software, hardware, and training.

Systems to fit your needs.

Our Advanced Systems product family is backed by a $1 billion multinational corporation. Our systems offer unequaled price/performance, and boast higher residual values over time than do IBM systems.

The family ranges in size from our medium-scale AS/3000 to our top-of-the-line AS/7000DPC which outperforms the IBM 3033. In terms of reliability, our Advanced Systems family has set new standards in the field.

And, of course, our systems are backed-up by the finest service and support force in the entire industry.

For more information, contact your local National Advanced Systems sales office, or contact Marketing Dept. A1, 800 East Middlefield Road, Mountain View, CA 94043, 415/962-6000.

National Advanced Systems. When it comes to compatibility, no one else even comes close.

National Advanced Systems
The Compatible Computer Company
A subsidiary of National Semiconductor

The Data Base Machine

Now, the first practical data base system permits a company to off-load over 70% CPU time — and get more than 25% increase in data base performance, too.

Software AG announces a major breakthrough in data processing technology: The Data Base Machine. We have succeeded in building the first practical backend data base system — a Data Base Management System without compromising overall system performance.

In fact, The Data Base Machine can actually increase total system performance by more than 25%!

Software AG has been able to build The Data Base Machine because of ADABAS, our highly respected Data Base Management System. Only through the architectural simplicity of this unique DBMS has a real-world solution to the problem of overhead trade-off and throughput efficiency been possible.

By using The Data Base Machine a company can at last recover valuable CPU resources, while actually increasing data base performance — without the need for expensive computer upgrade.

The Data Base Machine also provides the foundation for the development of a true Distributed Data Processing environment — the creation of networks in which functions are decentralized into easy-to-manage subsystems through dedicated, high-performance computers.

The Data Base Machine promises to have a significant effect on the data processing systems of the future. If you'd like to know more about this revolutionary software system, simply fill in the coupon, and mail it in today.

Let Software AG show you how The Data Base Machine can bring greater cost-effective performance to your DP environment.

Name ________________
Title ________________
Company ________________
Address ________________
City ________________
State ________ Zip ________
Telephone No. ________________
Computer ________________
Operating System ________________
DBMS ________________

SOFTWARE AG
OF NORTH AMERICA, INC

Reston International Center
11800 Sunrise Valley Drive, Reston, VA 22091
(703) 860-5050
1201

Structured Methods: The Impossible Dream?

BY MARK S. LIPPARD

It took three years for the University of Toronto to introduce structured methods into its Student Record Services division. Here's how the staff did it — and what they learned.

Student Record Services (SRS), a division of the University of Toronto, is responsible for maintaining a complex IBM IMS data base system for recording applicant, student and fees information and for developing systems to access the information. To help it do its job more efficiently, SRS has introduced structured methods and is in the process of developing a completely structured life cycle.

In describing SRS' transition to a structured approach, this article will present:

- A general analysis of the situation before and during 1976, before the introduction of structured methods.
- An analysis for each of the three years — 1977, 1978 and 1979 — in which the structured methods were introduced.
- A brief discussion of where SRS is, at present, in the process of developing a structured life cycle.

This description of SRS' experience is not intended to serve as an outline of how to introduce structured methods in other organizations. Instead, it is intended to illustrate the difficulties and costs of introducing a new methodology as well as the benefits of using structured methods.

The experience at SRS does indicate that there may be guidelines that can be followed by other organizations. They include the following:

- Management must be committed to the introduction of structured methodologies and be able to demonstrate its attitude to the staff.
- Structured methods should not be applied directly from a book. They must be modified to meet the requirements of a specific environment.
- The introduction of structured methods requires a well-developed interface between management and staff.
- Management must be willing to invest a large amount of its time as well as the staff's time.

The SRS story also illustrates the costs of introducing structured methods and the benefits of using structured methods. The main cost was that associated with change. The changes at SRS were accompanied by staff frustration and insecurity resulting in low levels of staff morale. In retrospect, it appears as though this cost could have been reduced, but not eliminated.

The organizational cost of the low morale was the cost of almost complete staff turnover. The human cost cannot be measured.

Another cost was the management time devoted to introducing the change. From 1976 through 1979, this cost was approximately $320,000.

The benefits of using structured methods include:

- Increased reliability of systems and elimination of maintenance costs.
- The ability to enhance systems at minimal cost and with complete success.
- High staff morale resulting from an environment that is progressive and stresses personal development.
- Increased staff productivity measured in number of systems produced and enhanced rather than in lines of code, which is no longer a meaningful measure.
- The ability to manage projects and assure that all projects are completed on time with complete documentation.
- A high level of user satisfaction and confidence resulting from all of the above benefits as well as others.

This narrative also illustrates that structured methods cannot be used as rules that always result in well-developed and easily enhanced systems.

The experience at SRS indicates that structured methods are an excellent mechanism for communicating ideas and for restating those ideas in increasingly specific terms. As with any method of communication, there are some rules and many guidelines. When the guidelines are applied in a creative and socially acceptable manner, the communication is more effective than when only the rules are followed.

As structured methods are only a method of communicating, they are not in themselves a panacea for improving system development. Improved systems do result when structured methods are used to communicate ideas among people willing to provide constructive criticism.

NOTE: This article does not include descriptions or definitions of structured methods and assumes that the reader has a basic understanding of these methods. And to maintain the structure of discussing changes on a yearly basis, not all dates are exact.

Before 1976

Before 1976, two organizations shared the responsibility for systems development. One division was responsible for user relations and system specification. The other was responsible for system design and implementation.

There were a number of traditional problems with the systems developed by the two groups:

- They were not completed on time.
- They had many bugs.
- They did not meet the users' expectations.
- They went into production without user documentation.

These problems were not a reflection on the ability or dedication of the system development staff. The group worked many hours and was always available in the evening to deal with the many problems that occurred. Instead, the problems were a reflection on the methods used to develop and enhance systems.

The system development or enhancement cycle usually consisted of the following stages:

1. An analyst would review the user's verbal or written request (most requests were verbal).
2. The analyst would transmit the request to a senior programmer/-analyst.
3. The programmer/analyst would discuss the project with a programmer, who might prepare a flowchart if the system was new and complex. Occasionally the programmer/analyst would confirm the discussion by preparing a brief written outline of the requirements.
4. The programmer would code and test the system until the user was satisfied.
5. The documentation was produced (maybe).

Outdated Documentation

More than 80% of all development time was devoted to the coding and testing phase. Projects were often 90% complete long after they had gone into production because the documentation had not been completed. As many systems were enhanced frequently because of user requests or error correction, any original documentation quickly became outdated and worthless. In order for the systems to survive, specific programmers became responsible for individual systems. Each programmer had to rely upon his memory of a system instead of the documentation.

This approach was partially successful in that it guaranteed that someone was capable of modifying a system. But the success of introducing enhancements was dependent upon the presence of a single individual rather than complete and meaningful documentation. The major drawback of this approach was that when a staff member resigned, the unwritten system documentation was lost.

Changes in '76

In early 1976, the two organizations were merged to form SRS. This change was made in response to pressure from a highly vocal user community that was not satisfied with the quality of the systems developed by these divisions. One of the reasons for the merger was to eliminate the separation

(Continued on In Depth/2)

(Continued from In Depth/1)

between specification and development in the hope that the quality of systems would increase.

When the divisions were merged, a new director was brought in from outside the two divisions. His appointment was the most important change resulting from the merger because he would lead the new division in the development and use of improved development methodologies. This is an important point because it meant that the direction would come from above.

During 1976, the director and some of the staff he had brought with him analyzed the existing systems. They realized that the problems mentioned in the preceding section were caused by the method (or lack of a method) used to develop systems. There were some attempts to improve the ability of the development staff by sending them to courses (a Hipo course offered by IBM stands out). The staff agreed that using a methodology like Hipo could result in improved systems, but they believed it was impossible to use a formal approach all the time in their environment.

To some extent, they were correct. The environment was one of continuous "fire fighting." Much time was devoted to correcting errors that had been made while attempting to correct previous errors or while making enhancements. We realized that to correct the problem with the quality of the existing systems, we would have to change both our environment and our methods. The following years would be devoted to this effort.

Emphasis on Redevelopment

While developing a coherent structured methodolgy, we continually attempted to redevelop procedures rather than to enhance them. This approach resulted in an initial increase in cost, but we were able to guarantee that subsequent enhancements would be made properly. By redeveloping procedures, we were also eliminating the source of the "fire fighting" mode of operation.

This approach was successful because the direction came from the top of the organization. The director had the ability to make certain the organization had the time and knowledge to remake its environment.

The main accomplishments in 1976 were an understanding of the problems and a plan to correct them. The main visible result of the problem analysis was increased staff dissatisfaction caused by the intervention of "outsiders who did not understand the difficulties of the environment." There was also an increase in staff frustration caused by the unfulfilled expectation that there would be an immediate improvement in the level of user satisfaction. These two developments in combination with others led to a decrease in staff morale.

Results in '77

The introduction of a coherent development methodology began in 1977. A number of changes in the development cycle were introduced. These changes included:

- The use of structured programming.
- The use of structured English (an internally developed form of pseudocode) to develop the structure and logic of a system before coding began.
- The use of structure charts based upon the Yourdon-Constantine model to graphically develop the structure of a system.
- The use of written specifications for all system development and enhancement.
- The walk-through.

The details, in 1977, of the nature of each of the five changes were as follows.

Structured programming. The use of structured programming techniques was based upon many of the concepts already in use by the development staff and the experience in the Hipo course. Three aspects of structured programming were emphasized:

- Meaningful comments.
- Functional modularization.
- Procedures no longer than one page.

The introduction of structured programming techniques was the easiest change made in this year as it involved coding, a familiar activity, rather than a new technique. In some cases, the programs that had been developed before 1977 were adequately modular-

(Continued on In Depth/6)

INTRODUCING FORMATION 4000.
The minicomputer that thinks it's an IBM 370.

Now you can run IBM 370 software on a minicomputer system—without reprogramming. Formation 4000 is not a plug-compatible processor. It's a low-cost, 32-bit minicomputer system, including a processor, controllers, and peripherals, that runs IBM 370 software.

With the Formation 4000 system, you can offer your customers this vast array of mainframe software at minicomputer prices. The F/4000 accommodates DOS/VS, OS/VS1, and VM 370 operating systems. You can also extend VM 370 capabilities with Formation's Transaction Management System. This software package simplifies the development of on-line/data base-oriented applications.

Formation 4000 virtually eliminates downtime through an economical redundancy feature. The redundancy design allows any or all system elements to be duplicated. Each component is fully functional and adds to the capability of the system under normal conditions, but serves as backup equipment when needed.

No need to worry about hardware. Formation installs and supports the total system.

So if you market software, customized computer systems, or data processing services, you can use Formation 4000 to expand your customer base and keep costs down. To find out more, write Formation, 823 East Gate Drive, Mt. Laurel, New Jersey 08054. Or call us at 609-234-5020.

formation
responsive computer systems

Informatics® products and services. Like adding to your staff.

Every day we help many Fortune 1000 companies improve productivity. Our software and services have upped the efficiency of their data processing operations. Our information processing services and professional personnel have enhanced the quality of their information management.

It's almost as if we added to their staff.

We can do the same for you. We offer proprietary or custom-designed software, professional services and facilities management, and information processing at your facility or ours.

Our people, experts in the EDP field, have in-depth knowledge of business and industry. Working with some of the most advanced software in the world, they can organize your information so that the computer gets right to the point... providing you with information packaged in a form most meaningful to you.

Call us if you need people, software, or information processing... or a combination of all three. Informatics. Providing computer software and services worldwide.

Corporate Offices/21031 Ventura Boulevard/Woodland Hills, California 91364/(213) 887-9040/Telex 69-8473.

® informatics inc

The Information Management Company.

Nobody networks

Our advanced software options are changing the way networks perform.

Sooner or later, you'll probably want to network.

You'll start by linking two computers together. Before you know it, you'll have every computer talking to every other computer. It's really just a matter of time.

And you can take the first step right now. With Digital.

Every Digital computer can be networked to every other Digital computer. Any time you're ready. All you need is DECnet™ software.

And Digital's networking software is exceptional. No other vendor can match us for sheer breadth of flexible, cost-effective networking alternatives. Besides standard networking capabilities, consider these Digital options.

Adaptive Routing. It's not necessary to physically connect every computer to every other computer. This reduces line costs. At the same time, network operations can continue even when communications links break down. Information is automatically rerouted around problem areas.

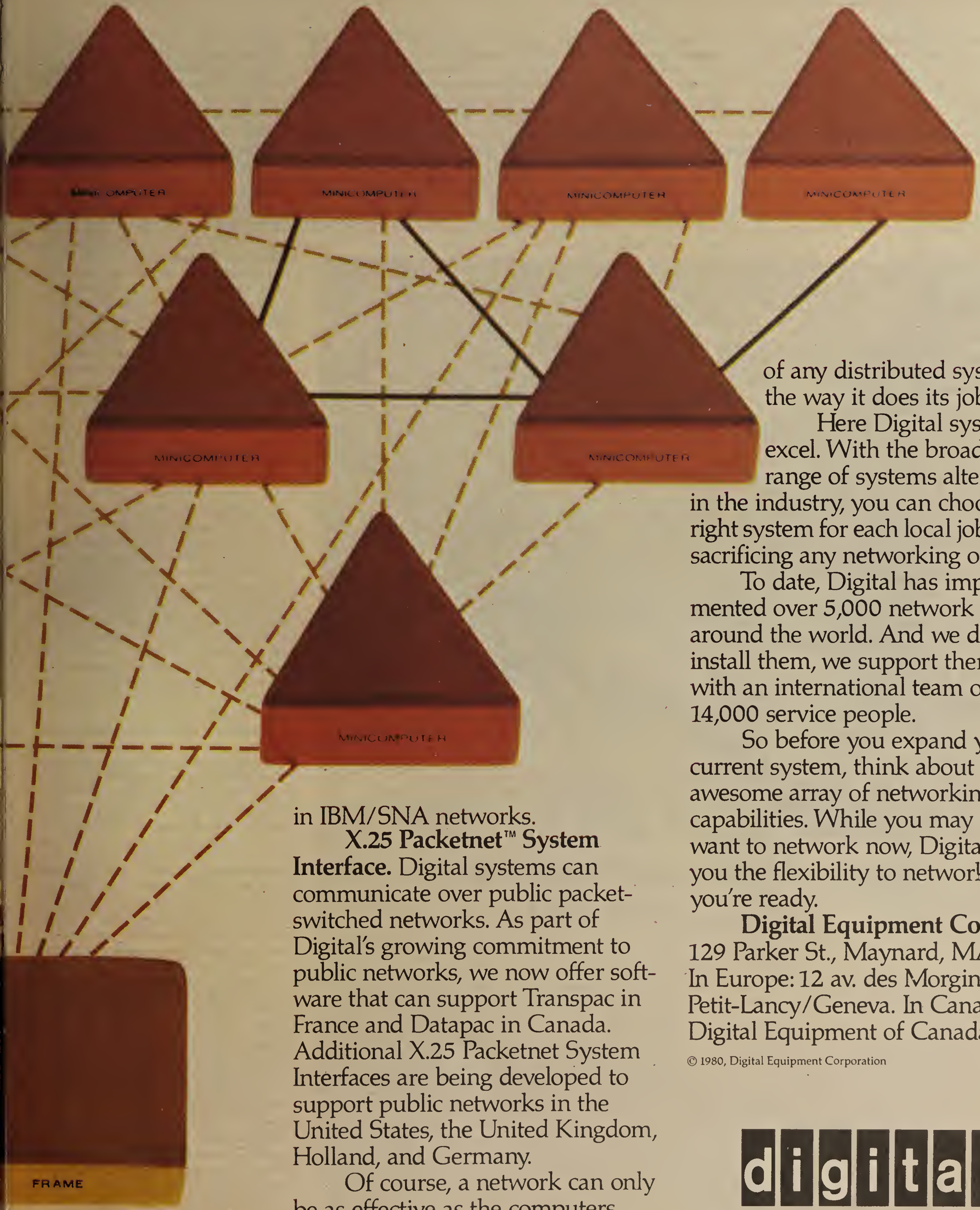
Network Command Terminals. You can control remote computers and remote applications from any location.

Enhanced Network Management. Control is the key to cost savings. DECnet lets you control the use of each communication line. Lets you add new systems to your network whenever you want without shutting down operations.

Multipoint Communications. Now one communication line can serve several Digital nodes simultaneously, reducing your line costs considerably.

Advanced Protocol Emulators. In addition to supporting Batch BISYNC, Interactive BISYNC, and other standard mainframe communications protocols, Digital offers an advanced SNA protocol emulator, so Digital systems can participate

like Digital.



in IBM/SNA networks.

X.25 Packetnet™ System Interface. Digital systems can communicate over public packet-switched networks. As part of Digital's growing commitment to public networks, we now offer software that can support Transpac in France and Datapac in Canada. Additional X.25 Packetnet System Interfaces are being developed to support public networks in the United States, the United Kingdom, Holland, and Germany.

Of course, a network can only be as effective as the computers within it. After all, most systems only use their networking capability 20 percent of the time. The real test of any distributed system is the way it does its job.

Here Digital systems excel. With the broadest range of systems alternatives in the industry, you can choose the right system for each local job, without sacrificing any networking options.

To date, Digital has implemented over 5,000 network nodes around the world. And we don't just install them, we support them, too, with an international team of over 14,000 service people.

So before you expand your current system, think about Digital's awesome array of networking capabilities. While you may not want to network now, Digital gives you the flexibility to network when you're ready.

Digital Equipment Corporation, 129 Parker St., Maynard, MA 01754. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

© 1980, Digital Equipment Corporation

digital

We change the way the world thinks.

(Continued from In Depth/2)

ized and contained adequate comments. In other cases, programs contained 1,500 line procedures and comments like "special routines and other stuff."

Structured English. The use of structured English was initiated by using pseudocode as introduced by the Hipo course. Initially the narrative was very detailed and much like code. In fact, many of the programmers wrote the code (secretly) and then wrote the pseudocode. Throughout the year, the narrative was gradually made more English-like and many standards for common phrases were developed.

This development was not easy. Many hours were devoted to discussing (arguing over) acceptable forms. One example was the replacement of the "DO UNTIL" construct with "repeat for each" because it was agreed that the latter was more appropriate and a clearer statement of what was to be accomplished.

Each aspect of the narrative was carefully examined and discussed. The rules for underlining and indentation changed many times. The development was not by trial and error, but rather by careful examination of everything that was done and agreement on the clearest method. Throughout the year, we gradually developed a set of rules for the use of structured English that resulted in the use of a narrative that was more general than pseudocode, but just as clear and complete.

Structured design. By the early part of the year, we were using a request calling structure that included an indented list of all modules in a procedure. The request calling structure was introduced as one aspect of structured programming. But while this was a beginning, it was not close to structured design.

The formal introduction of structured design to the development staff began with a Deltak, Inc. video course narrated by Ed Yourdon and Larry Constantine. Attendance at the approximately 15 sessions was mandatory. One module was completed every week. The course leader was one of the staff brought to SRS by the director. Each module was discussed at a weekly tutorial and the staff was required to begin using the various techniques as they were learned.

By the end of the year, the programmers were required to complete a structure chart before beginning the structured English. Some staff were still secretly completing the code before developing the structured English and structure charts, but others were able to begin with the structured English and then develop the structure chart. We were using structure charts which followed the Yourdon-Constantine model almost exactly.

Specifications. In the middle of the year, we began to require written specifications for every project, no matter how small. The first specifications were either extremely detailed and described only what was to be done or were very general, explaining that there was a specific problem that had to be solved.

Throughout the year, the amount of information included in the specifications was increased. By the end of the year, there was agreement that at the very least the specification must include a statement of purpose and a specification of what was to be done.

Walk-Throughs

Walk-throughs. We began to have walk-throughs for all projects by the middle of the year. The walk-through consisted of a presentation and discussion of the specification, the design and the code. Senior management attended all walk-throughs. Although most writers agree that senior management should not participate in walk-throughs, we found that the only method for assuring that the staff followed the new methods was to have management participate at walk-throughs.

The introduction of walk-throughs had many effects, both immediate and deferred. The immediate effects included a high level of dissatisfaction and frustration by most of the programming staff. The main cause of this was that their work was being publicly criticized.

The public nature of the walk-through was a very difficult adjustment for programmers who had always worked alone. Programmers disliked presenting their own work and

Where would your hardware be without software?

Nowhere. Your hardware would be lost without exceptional system software to guarantee maximum productivity.

Nixdorf Computer Software Company (NCSC) is the world leader in system software for users of IBM System/360, 370, 4300 and plug-compatible computers.

The many NCSC products which improve your productivity are EDOS/VS—increased productivity over IBM DOS/VS and DOS/VSE; ECON—enhanced interactive console system; NCSC Database and NCSC Datadictionary—complete data base management system; DEX—online data entry system; and PDMS—online programming system.

Productivity through better software is what NCSC is all about. Contact any one of our offices to obtain more information and to schedule an installation in your operation. NCSC headquarters are located at 6517 Everglades Drive, Richmond, Virginia 23225. Call us in Richmond at 804/276-9200, Telex 82 83 94, New Jersey 201/460-8888, Chicago 312/635-6310, Dallas 214/247-2004, Los Angeles 714/634-0733.

Nixdorf Computer Software Company

NIXDORF
COMPUTER

were reluctant to criticize the work of their peers. This resulted in most of the criticism coming from management. Walk-throughs soon became known as "walk-overs."

The first year was difficult. Management was attempting to demonstrate that structured methods were superior to traditional approaches at the same time it was teaching the structured methods. The programmers were naturally defensive and the managers were critical. A positive environment did not result.

The long-term effects were that by using the walk-through as an educational vehicle, the programmers were able to learn how to use structured methods. By participating, management was able to develop ideas and standards on how systems should be developed and tailor the methods to local needs. Most important, management was able to guarantee that all programmers used structured methods.

The walk-through was the catalyst in our development of structured methods. It allowed us to test various ideas in a production environment and see the result. The walk-through was the vehicle for disseminating new ideas and making certain they were used. All aspects of the life cycle came together in the walk-through and could be examined individually or in the context of the entire life cycle.

Walk-throughs led to a number of staff problems, but without the walk-through, we could not have accomplished as much as we did.

General Comments on '77

1977 was a year of great development and increasing staff frustration. In retrospect, it seems that the best method of guaranteeing successful introduction and use of structured methods was to have direction from above. In our case, the presence of the director was critically important because many of the ideas came from him.

The walk-throughs consisted of heated debates on the best method for describing a process. The debates were productive in that they allowed us to develop our understanding of what we were doing, but they were unproductive in that they raised the level of insecurity of the staff.

The environment became very dynamic. What was satisfactory on Monday was often unsatisfactory by Friday. The staff wanted rules so they could do what was expected of them, but it was impossible to provide rules. To say the least, it was a difficult time for both staff and management.

An important result of the changes was that it became possible to manage projects. As all projects were specified and uniquely identified, we were able to identify all development activity, no matter how brief. The use of structured design made it possible to monitor the progress of a project because once the design was complete, all parts of the project were known.

In 1978 we refined the techniques previously introduced and firmly established structured techniques as the only method of developing or enhancing a procedure. It was also the year staff turnover increased. The combination of severe budget reduction, organizational changes and low staff morale all contributed to an almost complete change in staff in the next 18 months.

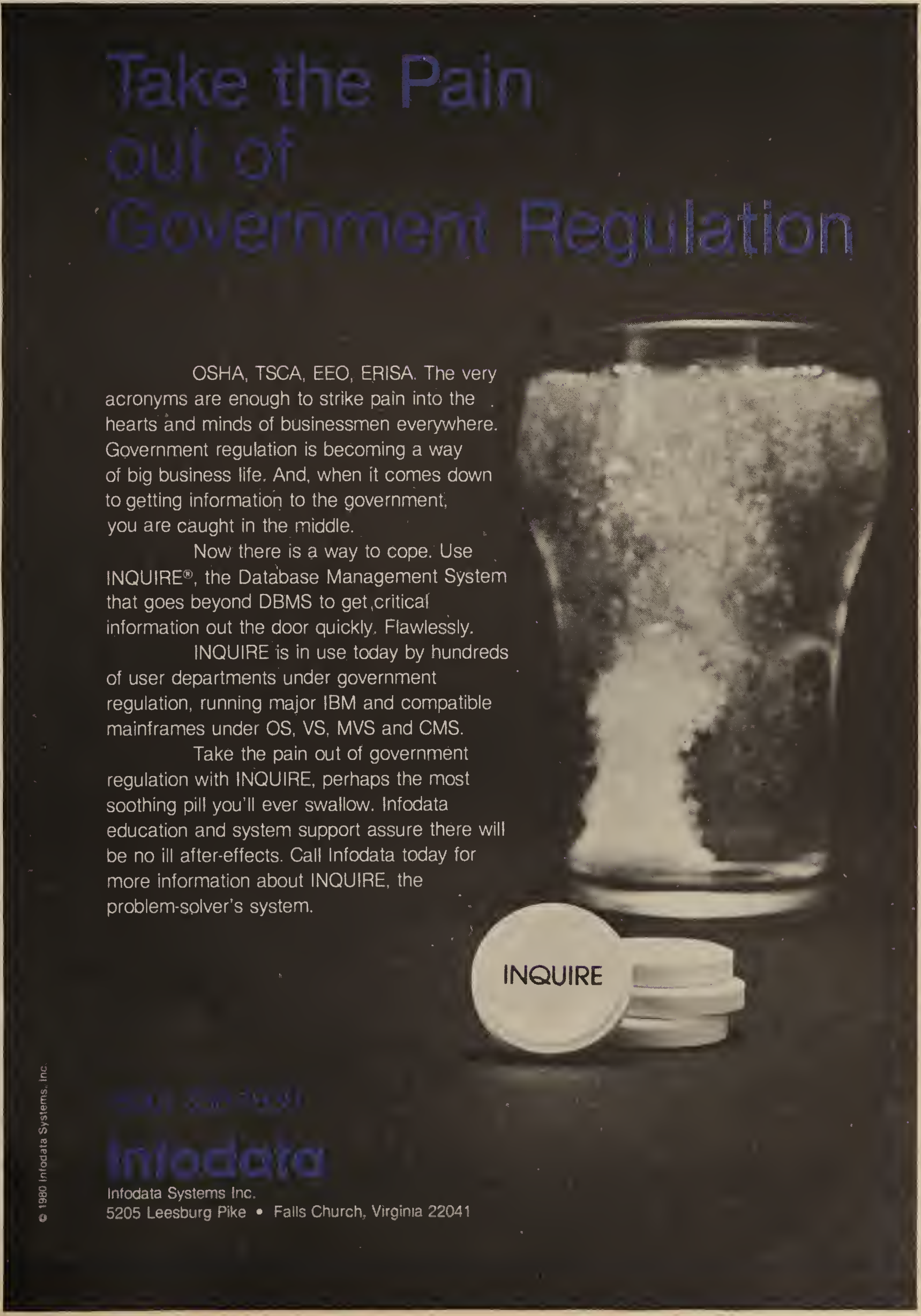
In the early part of the year, the director temporarily assumed control over the development staff so he could have direct input into the development process. More pressure was applied to the staff to learn and use the new techniques and more guidance was provided. The difficulties of getting the staff to continue to use structured methods at the same time they were developing their ability to use the methods surpassed the challenge of the initial introduction.

Our development in each area of structured methods was as follows.

Structured programming. The use of structured programming became firmly entrenched in our life cycle. The combination of structured design and structured English assured that the code was well structured. This was the first major benefit derived from using structured methods. Most of the questions relating to the design of a procedure were resolved before the code was written.

Writing code was becoming a routine task. No longer were we attempting to deal with problems at the code level.

(Continued on In Depth/8)



Take the Pain out of Government Regulation

OSHA, TSCA, EEO, ERISA. The very acronyms are enough to strike pain into the hearts and minds of businessmen everywhere. Government regulation is becoming a way of big business life. And, when it comes down to getting information to the government, you are caught in the middle.

Now there is a way to cope. Use INQUIRE®, the Database Management System that goes beyond DBMS to get critical information out the door quickly. Flawlessly.

INQUIRE is in use today by hundreds of user departments under government regulation, running major IBM and compatible mainframes under OS, VS, MVS and CMS.

Take the pain out of government regulation with INQUIRE, perhaps the most soothing pill you'll ever swallow. Infodata education and system support assure there will be no ill after-effects. Call Infodata today for more information about INQUIRE, the problem-solver's system.

[illegible]

Infodata
Infodata Systems Inc.
5205 Leesburg Pike • Falls Church, Virginia 22041

© 1980 Infodata Systems, Inc.

(Continued from In Depth/7)

The use of structured design allowed us to assign the coding of a single procedure to large numbers of staff with the assurance that each section of the procedure would properly fit in place. The structured English description of the function of each module that was approved in the design stage made the inclusion of meaningful comments easy for the staff.

Many of our guidelines for coding were developed through our experience in redeveloping a major financial application. This procedure was redeveloped because it had been the source of many costly problems. The procedure was redeveloped by having the user verify the design and structured English as they were developed. The resulting code was our first excellent example of structured programming.

We began to adopt standards like separating input and output variables in PL/I CALL statements by inserting a comment indicator between the variables; for example, CALL PROC (variables output/**/variables input). We completely eliminated global variables and used many external modules. The procedure functioned without error when it went into production.

We were still developing our ideas on what guidelines should be used to evaluate the quality of code, but for the most part we had fully implemented structured programming.

Structured English. We became more and more aware of the importance of structured English in the development life cycle. It was the vehicle used to transform a specification into code. It served as the verfication that a specification was clear and complete. It informed both the user and the analyst of exactly how the designer had interpreted the specification. In addition, it was the basis of the code and if properly done, the structured English almost eliminated any problems with code.

We discovered that structured English could be used as the basis of operating instructions for interactive applications. Its proper use assured that the operating instructions would be complete and clear. We began to develop the operating instructions as the first step of the design phase because they were the complete statement of how the system should function.

We devoted much of the walkthrough time to discussing various forms of structured English. We began to use decision tables to supplement or refine structured English statements. Structured English had become our main method of communicating the structure and logic of systems. We found that it was by far the clearest and thus the best form of communication we had at our disposal. We began to encourage our users to learn to read structured English so that they could verify that a system fulfilled their expectations.

Structured design. We continued to develop our ability to use the Yourdon-Constantine model of structured design. In the middle of the year, we completed a three-man-year financial procedure that was developed entirely with structured methods. We used the classic top-down approach that we found possible only with structured methods. We were able to begin coding the top levels before the lower levels were completely designed. We began testing at a very early stage of the development using program stubs.

This procedure was developed to replace an existing procedure that had never functioned correctly and included a great number of enhancements. The project was completed on time and the system functioned properly.

It is important to note that during the development, the user added a number of functions we were able to include in the procedure; but when the design was complete, we realized that given the additional functions, we could have used a better design. We documented this and signed the project off.

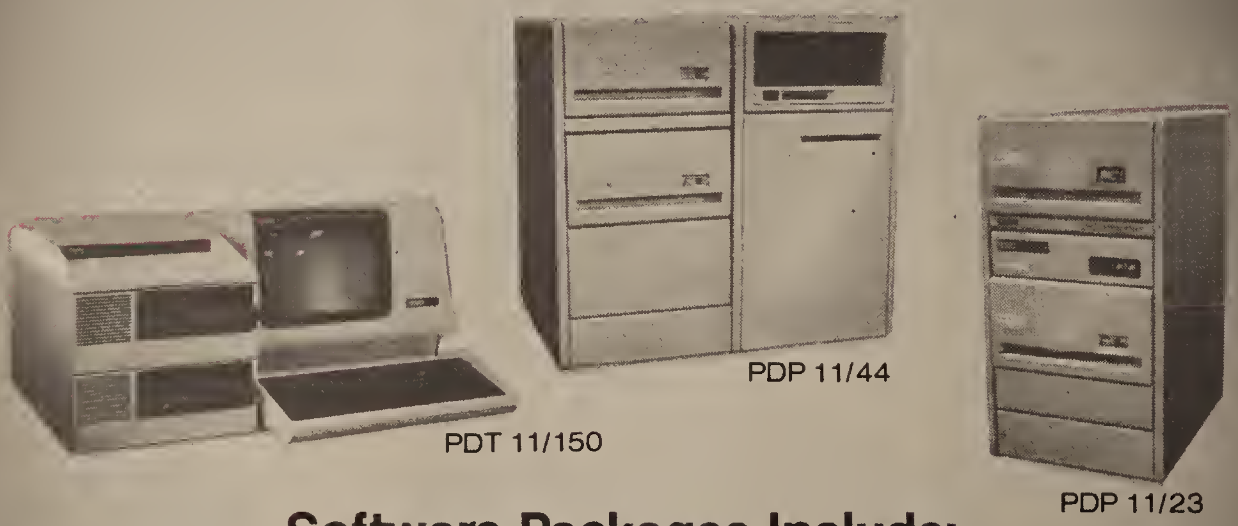
This procedure is still operating today, although it has been enhanced many times. We have never had any difficulty introducing an enhancement because of its well-defined structure. In addition, we discovered we did not have to read the code to determine what the procedure did or how it did it. The structure charts and structured English provided enough accurate information to answer almost any question the user posed.

NOW AVAILABLE FOR PROMPT DELIVERY FROM

HAMILTON

DEC PDP 11

FAMILY OF MINI-SYSTEMS



Software Packages Include:

☐ Word Processing
☐ Inventory Control
☐ Accounting Packages
☐ Information Storage and Retrieval
☐ Financial Reports
☐ Finite Stress Analysis
☐ Micro-Processor Development
☐ Commercial Graphics

RENTAL • SALE • SERVICE • SUPPORT

IMMEDIATE DELIVERY
FROM STOCK
ALL RENTALS INCLUDE
MAINTENANCE.
PURCHASE OPTION
LEASE PLAN AVAILABLE

HAMILTON
Hamilton Rentals
One Penn Plaza, New York 10119

212-695-1936
TOLL FREE 800-223-2430

LONDON PARIS DUSSELDORF TORONTO

Once we had developed the ability to use the Yourdon-Constantine model, we began to evaluate its attributes to determine if they were appropriate for our environment. We found that the interface descriptions for module connections on the structure chart were not worth the effort. The description of interfaces is important, but we discovered that without the description of the function of each module, the interfaces were not meaningful. We began to include the interface description with the structured English.

'Boxing' Tried

As more projects were completed, we began to realize that the structure chart was only a preliminary guideline for the designer. It was difficult to evaluate the appropriateness of the design without the description of the function of each module. As we realized this, we began to place less emphasis upon the structure chart and more emphasis upon the structured English. We introduced the technique of "boxing."

"Boxing" is a method of illustrating the modules within a single procedure. A box is drawn around one or more structured English statements, and a module name is placed in the upper right-hand corner of the box. If a single statement was boxed, we included a more detailed description on another page of the structured English. If a group of statements were boxed, that was the complete description of the module.

Eventually we stopped boxing because we found that a single statement describing a lower level module was usually sufficient, and the box was replaced by the name of the module. Instead of noting the module name where a more complete description was given, we began using numbered notes.

Specifications. The specifications we had begun writing in the previous year were straightforward, but did not provide much information on the project outside of exactly what was to be done. By the middle of the year, we had developed the ability to write specifications that were complete and clear. As most analysts know, this is not easy to accomplish with the English language.

For the first time, it became possible to ask the user to read the specification and confirm, in writing, that it was complete. This was a major accomplishment because it allowed us to have an adequate concept of what the system included before we began to design the procedures.

We began to structure our specifications by writing general descriptions of functions and detailing the functions in appendixes. We began to write specifications that were more English-like by including data base field names and detailed logic in parentheses or as notes following the English description. We discovered that the more we suppressed the technical details of our system, the more readable the specification became. We had learned to write specifications that could be understood by both technical and nontechnical people.

We found that to be understandable, the specification had to be placed in the context of the entire system in which the procedure to be developed would function. To accomplish this, a section entitled "Discussion" was added to the specification. The purpose of the discussion was to allow the analyst to give background to the project that would put it in context so it could be properly evaluated in a walk-through.

We also began to include rudimentary testing specifications. Previously tests were designed by the person responsible for developing the procedure. We found that the designer often did not fully understand how the system would be used and that the user found many problems after the system went into production. Including testing instructions with the specification was the first step in placing the responsibility for testing with the user rather than with the developer.

Walk-throughs. By the end of the year, most of the staff had accepted the walk-through as an important aspect of the development process. This change in attitude was caused by both the presence of many new staff members who had no vested interest in old methods and the occurence of much less destructive criticism in the walk-through.

The walk-through had become the central aspect of our development process. All stages of the life cycle were

(Continued on In Depth/10)

Need more speed? More power? More growth potential?

ULTIMATE, the new heavy-duty computer system.
It supports your Reality® software, too.

If added terminals and heavier workloads are making your computer system respond slower and slower, it's time you looked into ULTIMATE.

ULTIMATE is the new heavy-duty system–that can also support Reality software in most cases with virtually no program modifications.

ULTIMATE ends your concerns about outgrowing a computer. Your investment in ULTIMATE remains secure, because ULTIMATE has all the power you need to support up to 64 terminals effectively. And you can readily add on-line disc storage for over a billion characters.

Response time, even with many different functions being performed simultaneously, is remarkably fast.

ULTIMATE is engineered by Honeywell for uncompromising performance and dependability. And service is available worldwide through Honeywell's own factory service network.

If you're looking for a better answer to your company's growing information needs, send for all the facts about ULTIMATE today.

THE ULTIMATE® COMPUTER
Available through selected dealers worldwide

FOR COMPLETE INFORMATION, MAIL THIS COUPON, OR CALL (201) 388-8800
THE ULTIMATE CORPORATION 77 Brant Avenue, Clark, N.J. 07066
☐ Send me more information about ULTIMATE
☐ Call me to arrange a demonstration
Phone
Name and title
Company
Street
City
state
zip

(Continued from In Depth/9)

reviewed and improved in the walk-through. The quality of specifications, designs and programs were evaluated on the basis of how easy they were to understand as well as their accuracy.

We realized that the quality of a system was dependent upon the group of people who participated in the walk-through. This awareness was enforced by the management attitude that all members of a walk-through shared responsibility for the system. No longer was a single person saddled with the responsibility for the success of a project.

By the end of the year, many walk-throughs were held without all managers being present. We realized that our walk-throughs were really presentations to management and that the staff should hold peer walk-throughs to review the material before it was presented. This was important because for the first time it gave the staff complete authority to determine what occurred in a walk-through while retaining management's ability to control the process.

General Comments on '78

At the end of the year, structured methods for design and code were firmly entrenched as the only method used to develop systems. Many of the staff were unable to develop even the simplest procedure without quickly completing a structure chart and structured English. We had forgotten that there was another approach.

We were experiencing the benefits of the structured approach. Projects were costing less to develop and the resulting systems were easier to enhance. The systems being produced were almost error free and most projects were completed on time. For the first time, the documentation was being completed before a system went into production because documentation was generated in each stage of the development process.

Each project was more effectively managed because each was clearly defined by a separate specification called a "project development request." The distinct phases of project development allowed easy monitoring of progress and allowed us to quickly discover areas that were costing more than we had forecast.

We began to develop a standards manual outlining acceptable techniques in coding and design. We found this to be extremely difficult because of the dynamic nature of our standards. The standards manual contained reasons for, and examples of, each standard to assure that we would remember why a technique was a standard.

As soon as the manual was distributed, we discovered that the staff wanted to follow it exactly. They wanted rules for acceptable behavior, but there were no rules, only guidelines. It was difficult to convince the staff that a specific construct might not be acceptable in all circumstances.

We began to realize that a design was good if a group of people thought it was good. The test of acceptability was public acceptance — not that the rules were followed. We realized that a design was evaluated subjectively rather than objectively and began to evaluate results with expressions like "clarity," "good taste" and "elegance."

We became more aware of the difficulty of enhancing the many procedures we supported that were not developed with structured methods. In some cases, the only way we could reliably enhance a procedure was to completely analyze it using structure charts and structured English. Even when the analysis was completed and its accuracy verified, the code was modified with great caution. In other cases, it was impossible to properly analyze the procedure and we were forced to rely upon our collective ability in the walk-through to verify the accuracy of the change.

VOLUME
DATA ENTRY
Name & Address
$18 per thousand
Call Collect
305/661-3468
ILM Corporation

The ease of enhancing structured procedures greatly contrasted with the difficulty of enhancing unstructured ones.

Testing Less Important

As our ability to develop procedures improved, testing became less important. We knew a procedure would function properly when the design was complete, and we knew the code was a correct restatement of the design. Although we did discover a few coding errors during testing, we realized that the main reason for testing was that it gave us "warmth" and sample output for the program binder.

Testing unstructured procedures was another matter. When we changed an unstructured procedure, we tested it exhaustively because we assumed we had introduced an error with the change.

The real benefits from the changes were becoming apparent. We were producing more procedures at a lower cost. We could not measure productivity in terms of lines of code because fewer statements were used; proper design minimized redundancy. Coding was also becoming a lower percentage of the cost of a project as more time was being devoted to design and considerably less to coding and testing.

Staff morale was beginning to rise. People began to realize that structured methods were working and their jobs were becoming more pleasant. Staff members were developing a sense of group awareness through participation in the walk-through and were beginning to publicly assist each other.

By the end of the year, the level of user satisfaction was increasing. Our users began to realize we could develop procedures that functioned properly and were completed on time. Our users had begun to trust and have confidence in us.

'79: Near Completion

In 1979 we began to work on the completion of the structured life cycle by introducing structured analysis to replace the narrative specification. We also continued to evaluate and refine the other phases of the structured life cycle.

Structured programming. We continued to develop our ability to write clear and concise code. We realized that code should be easy to read and understand. We began to use comments to explain the purpose of a module as well as the purpose of groups of statements.

Coding had become a minor aspect of almost all projects. In most cases, less than 15% of project costs were associated with coding. As our ability to design systems improved, the challenge of coding decreased. Structured programming is guaranteed when structured design is used.

Structured English. Structured English became more important as the main vehicle for communicating how a function would be completed. Over the past two years, we had discussed using structured English to write the specification, but decided that our users should not be required to learn a new language. In the middle of the year, we began to revise our decision.

One of the main reasons for the reevaluation was a presentation on structured analysis given by a representative from Yourdon, Inc. at the summer share meeting. The representative emphasized that the clearest method for communicating how functions were completed was through the use of structured English. We were already experimenting with structured analysis, and the Yourdon method of describing specific functions ("primitives") with structured English seemed to be the best solution to the description problem. (The development of structured analysis is outlined in the following section on specifications.)

The form of structured English we were using was too specific for our users to accept, so we developed a more general form that was much

(Continued on In Depth/14)

Use with an IBM or non-IBM computer

Our IBM 3101 is a simple-to-use, versatile ASCII terminal that can be attached to most business computer systems–IBM or non-IBM–or used to access many remote computing and time-sharing services.

Whether your applications are budgeting, engineering, financial planning, interactive problem solving, or even simple data entry and retrieval, there's a place in your business for the 3101. Prices start at just $1,295.

If you're now using a hard-copy terminal to perform computer-based inquiries or calculations, the 3101 can display your information faster on a high-resolution video screen. And if you're currently using a display, compare it to the 3101. We're so convinced of its high quality that we're offering a *15-day trial* so you can see for yourself.

Order it with a toll-free phone call

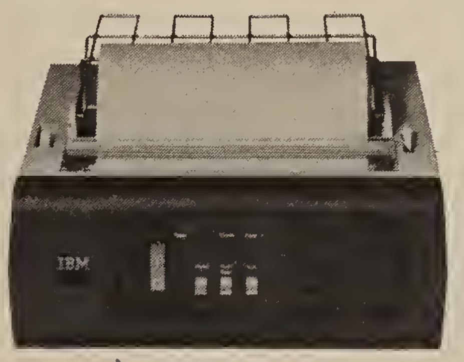
You can order a 3101 by just calling our toll-free number. In the continental USA, call 800-431-2670. In New York, call 800-942-1918. In Alaska, Hawaii and Puerto Rico, call collect 914-696-6840. You'll talk to a specialist who can take your order or answer your detailed questions. Delivery of the 3101 can be as soon as *45* days.

Out of the carton and into operation

When the 3101 arrives, you simply connect three modular elements–the display, the logic element and the keyboard–plug it in, position the setup switches and put it into operation. It takes just a few minutes. Accessible setup switches in the keyboard let you select functions such as line speed, parity, scroll and reverse video. The 3101 weighs 38 pounds so you can move it easily.

Human engineering inside and out

The 12-inch diagonal screen can be swiveled and tilted to cut interference from overhead lighting. It displays a maximum of 1,920 characters in 24 lines. You'll see and feel the quality, from its comfortable, solid keyboard to its crisp, easy-to-read display.



A low-cost printer, too

You can couple our 3102 printer to the 3101. You'll have the double convenience of displaying all your information, while capturing a hard copy of the data being displayed. The 3102 printer is lightweight and priced at just $1,295, and is also available for a 15-day trial.

Selected specifications and prices

There are two 3101 configurations: character transmission and block transmission. Character transmission lets you use it like a teletypewriter. Block transmission provides sophisticated editing capabilities, such as insert/delete and full cursor control, along with field functions like blinking, high intensity and protected fields.

The prices for the display terminal start at $1,295 for the character transmission model, and $1,495 for the block model. Volume procurements can save you up to twenty percent for either configuration of the terminal. Prices and current schedules subject to change.

ROM IBM.
OURSELF.

Call 800-431-2670 (in N.Y. 800-942-1918) or send the coupon.

IBM Data Processing Division
National Marketing Center
1133 Westchester Avenue
White Plains, NY 10604

IBM®
Data Processing Division

I'm interested in these exciting IBM products.
☐ Yes, send me more information and an order form. ☐ Call me with information.
Name________ Title________
Company________
Address________
City________ State________ Zip________ Phone________
CW

TAKE CHARGE OF YOUR CAREER

The Best EDP Professional positions Are Usually Not Advertised
- In fact, 75% of the Top EDP Career Opportunities Are Filled By the Country's 150 Foremost EDP Recruiters.
- These Recruiters Rely Almost Exclusively On Their Resume Files For Candidates
- To Optimize Your Career Opportunities. Send $14 95 and Receive Current Names & Addresses of the 150 Foremost Recruiters

MANAGEMENT INTERNATIONAL
Career Development Division
Box 5111, FDR Station
New York, NY 10150

Hard sell.

Just what you've been waiting for – another hardware manufacturer with another line of products.

We understand the problems facing users, OEMs, and hardware manufacturers. So we make sure our systems are modular and flexible. They're expandable and upgradeable without reprogramming. And they can interface with other types of computers on the market.

Choose from complete systems or from individual terminals, printers, and disk drives – 5¼" or 8" floppies and 8" Winchester disks that offer from 630K bytes to 30 megabytes.

We also offer our ZCB single board computer with PROM, RAM, serial and parallel ports. Plus High Resolution Graphic, Video Digitizer, and Precision Analog boards. You can get a memory-mapped video board for development of systems with fast, efficient screen handling.

All our products are S-100 Bus compatible. So you can build products with virtually any capabilities by slipping in any board you want.

We don't just make hardware, we make it simple.

Contact Gary Bennett, Vector Support Center, 31364 Via Colinas, Westlake Village, CA 91362. Or call 213/991-2302.

VECTOR

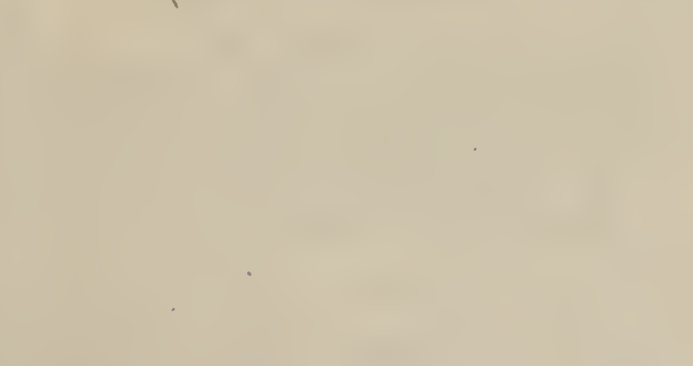
Economy Sized Computer™ Hardware

Soft sell.

We don't think software should be hard to use.

To make things easier for you, we offer software expertise as well as software.

Our Z80 assembly language comes with RAID (our memory-mapped rapid interactive debugger) which saves debugging time, and SCOPE (our screen-oriented program editor) which provides advanced word processing in a program editor. It cuts 35% of the time it takes to create new programs. What's more, ZSM is a Z80 assembler that generates files compatible with higher level languages – including CIS COBOL, PASCAL, APL, and FORTRAN.



We offer CP/M, the industry standard operating system. So transportable software developed on one system can run on others.

Vector offers a great system for developing BASIC programs with an interpreter for on-line development and an optional compiler for end-user programs.

It's the least we could do. Because we make software development a soft job.

Contact Gary Bennett, Vector Support Center, 31364 Via Colinas, Westlake Village, CA 91362. Or call 213/991-2302.

SCOPE and RAID - trademarked Vector Graphic Inc. Z80 - trademarked ZILOG, Inc. CP/M - Registered DIGITAL Research Inc. CIS COBOL - trademarked Micro Focus

VECTOR

Economy Sized Computer™ Software

(Continued from In Depth/11)

more English-like. We began to insist that all statements be grammatically complete sentences beginning with a capital letter and ending with a period. We decided that all descriptions should not have more than two levels of indentation to avoid complexity. We adopted new constructs like "Calculate service charge when all of the following are true:" (followed by a list of conditions).

Through the year, we experimented with various forms of structured English and completed one production project as a test of the new method. As with all new methods that had been introduced, there was much revision resulting in frustration among the staff involved in this project.

By the end of the year, we were using one form of structured English for specifications and another form for design. This also led to confusion among our staff.

Structured design. By the beginning of the year, the use of structure charts had become a natural part of the development process. Most staff had no difficulty preparing a structure chart from the narrative specification, and in many cases the programmer/analysts had "forgotten" how to develop a procedure without using a structure chart.

In the spring, the programming manager attended a presentation by Michael Jackson on his technique for designing a procedure based upon the structure of the input and the output. We found this approach interesting and examined it to determine if we should emphasize the Jackson technique instead of the Yourdon functional approach.

After using the Jackson technique, we agreed that while it was sound, following it too closely could result in inappropriate designs. Like Yourdon's method, Jackson's approach was successful only when modified to meet local needs. While descriptions of input and output structures are included with design documentation, our main thrust is still functional modularization.

The examination of a different methodology was important to our development because it led to a reevaluation of our methods. One of the dangers in adopting a specific methodology is that it can become a rote process. By reevaluating the method, we minimized the possibility that we would use structured design because it was a rule rather than because it was the best approach to design.

Specifications. By the middle of the year, we were developing narrative specifications that were well structured, accurate and understood by the user. The narrative specifications we were preparing had the traditional drawbacks: They were difficult to maintain and often difficult to understand because of their length. No matter how well structured the narrative was, its sheer volume made it difficult to comprehend.

As mentioned in the preceding section on structured English, we had begun to experiment with the data flow diagrams used in structured analysis. The data flow diagrams we decided to use consisted of rectangles, as used in Soft Tech's SADT, instead of Yourdon-DeMarco bubbles.

By using rectangles, we could make each side meaningful. The left side was used for inputs and the right for outputs. In our opinion, this made the diagrams easier to read than when bubbles were used. It also encouraged a left-to-right reading of the diagram, which we found preferable to the apparent chaos that could result from the use of bubbles.

We tried using the top of the rectangle for "controls" (data that caused the function to begin) and the bottom of the rectangle for "environment" (data that had to exist for the function to complete). We decided not to use the top and bottom because it complicated the diagram more than it added information. Because simplicity was our watchword, discarding this complication was the obvious thing to do. We did agree that when using data flow diagrams to describe physical systems, for example, JCL procedures, the controls and environment were important enough to be included in the diagram.

At the end of the year, we experimented with data flow diagrams in two projects. The first project was to develop a new system. We found that the most important aspect of the diagram was the description of the functions and that only inputs and outputs were

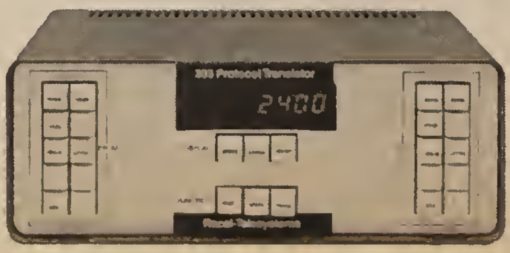
FINALLY,
A WORD PROCESSING BREAKTHROUGH THAT LETS
IBM
COMMUNICATE WITH
WANG
COMMUNICATE WITH
DEC
COMMUNICATE WITH
LEXITRON
COMMUNICATE WITH
VYDEC
ETC., ETC., ETC.

Racal-Telesystems, the pioneer in media conversion can solve your communicating word processors' incompatibility problems.

Now you can establish a network of communicating word processors, from different vendors. You can dial up your regional office and transmit a 10-page report in less than three minutes...even though you have different word processors. It's possible by using the Racal-Telesystems 303 Protocol Translator. This device allows users of two different communicating word processors to communicate through electronic on-line conversion of the highly specialized word processing protocols and codes.

For complete details and a data sheet, call or write today.

Racal-Telesystems
the new name for Telesystems Network
Racal-Telesystems, Inc. 410 N. Michigan Avenue Chicago, Illinois 60611 (312) 329-0700



needed. In the second project, we were analyzing an existing procedure and found that the most informative general statement of the system had to include controls and environment. The difference between the two projects was that the first was a logical description of a proposed system and the second was a physical description of an existing system.

We began to realize that a physical description for a well-designed logical system was often unnecessary. The reason was that the physical system was usually similar to the logical system.

Walk-throughs. As walk-throughs were now a fully accepted part of our life cycle, we began to modify our approach. By the end of the year, management — with the exception of the manager of programming — was no longer attending walk-throughs. We discovered that when management was not present, the staff was much more willing to comment on the work being presented and the quality of the finished product did not decline. Because of the positive effect on the staff, we decided that management should not attend walk-throughs unless specifically invited.

General Comments on '79

By the middle of the year, we had finished the introduction of new and revised methods for our life cycle, but had discovered that the narrative specification was not satisfactory. We began the cycle of change again. The effect on the staff was the same as it had been in every change that had been introduced. The rate of change was so rapid that techniques accepted one week became outdated the next.

We began to experience a shift in the percentage of time devoted to each aspect of the life cycle. The use of structured design had greatly reduced the percentage of time devoted to coding and testing. The introduction of structured analysis now reduced the percentage of time devoted to design. More and more of the project code was being devoted to analysis and specification.

By the beginning of the year, we had used all aspects of a completely structured life cycle. We began to use structured analysis for all projects and continued to develop guidelines for its use in our environment.

By the middle of the year, we were prepared to begin developing guidelines describing the methodologies we were using. As with all projects, we used a structured approach. At present, we are developing these guidelines, and the project is scheduled for completion by early 1981.

We are now using a completely structured life cycle and have begun to develop our users' ability to use structured analysis to assist us in developing systems for them. At present, more than 70% of a project's cost is associated with the analysis/specification process. Approximately 20% is devoted to design and only 10% devoted to coding and testing.

Mark S. Lippard is the director of Student Record Services at the University of Toronto.

HOW TO SUPPLY YOUR BUSINESS WITH TECHNICAL TALENT THROUGH GOVERNMENT FUNDING and more....

CETA For Your Business will tell you how to properly acquire and run effective **CETA** programs amounting to as much as $250,000.
Also, **WE WILL SHOW YOU HOW** your business **SHOULD:**

- GENERATE RENEWABLE CONTRACTS AVERAGING $100,000 IN 30 DAYS
- ESTABLISH OR INCREASE CONSISTENT CASH FLOW
- INCREASE PROFIT FROM SALES (50 - 80%)
- OPEN NEW MARKETS FOR PRODUCTS

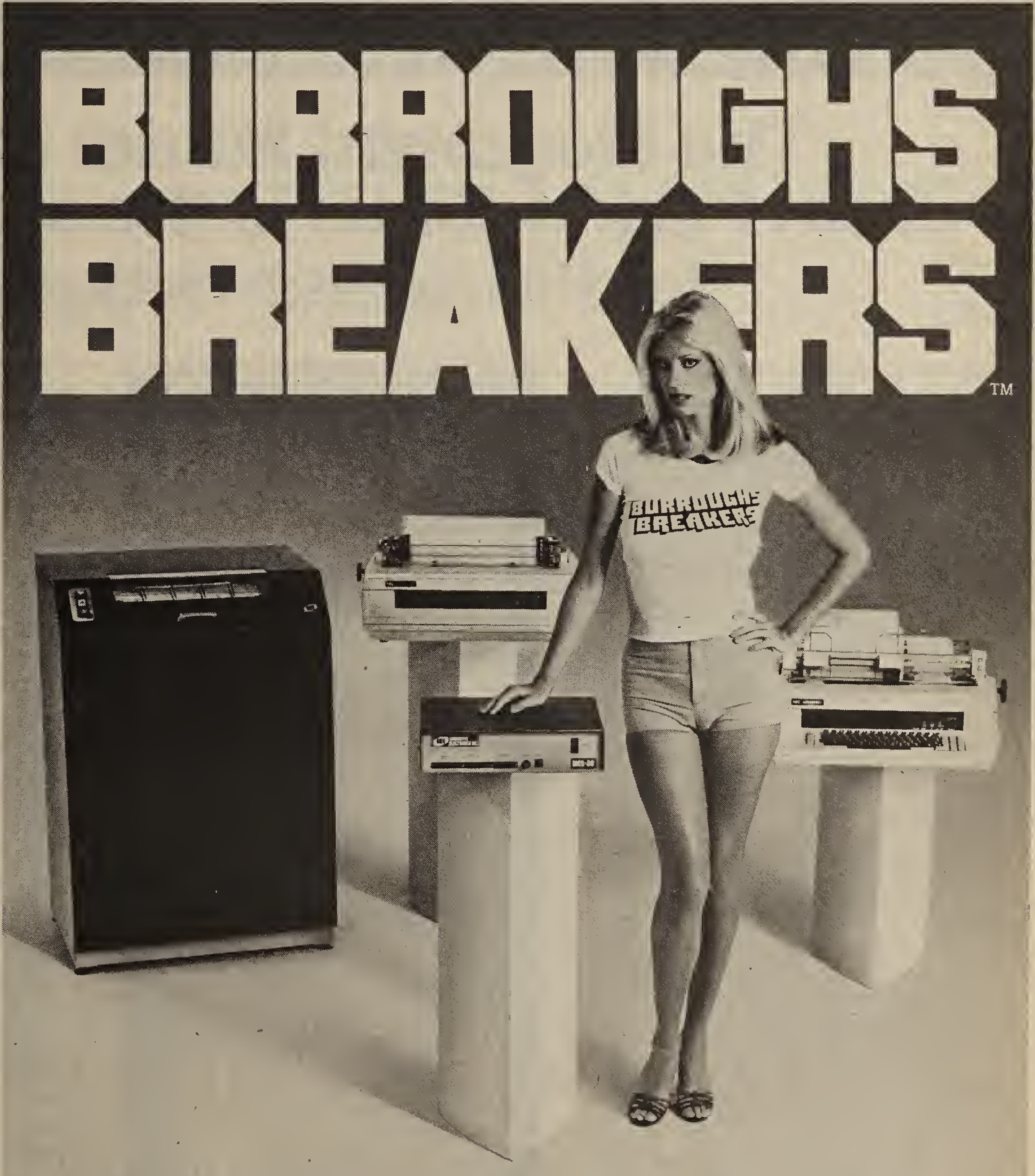
AND BENEFIT BY:

- REIMBURSEMENT FOR OVERHEAD EXPENSES
- OPENING OR INCREASING BANK LINES OF CREDIT
- ADDING NEW PROFIT CENTER
- ACCRUING NEW TAX ADVANTAGES
- INCREASING QUALIFIED TECHNICAL TALENT

To begin, you must be decisive and act immediately!!!

Send your $95.00 (TAX DEDUCTABLE) investment by check or money order and receive this New Six-Sectioned detailed, step-by-step Publication Guaranteed and PROVEN TO WORK!!!

J & G INDUSTRIES, INC. P.O. Box 2069
Columbia, Maryland 21045
Allow 10 days for delivery



Break Burroughs peripheral dependence and save money with higher performance. The MCS-80 allows you to connect the peripheral of your choice to any Burroughs Poll/Select network through RS-232, concatenation, or TDI interfaces. Make your dumb CRT look brilliant to your Burroughs computer. Take advantage of Burroughs TMS word processing software with the NEC, 55 CPS letter quality printer. KSR models offer total keyboard support. Many forms handling options available. Our ultra quiet 300 LPM chain printer suits your office environment. Fully formed, clear characters are printed, including multi-copy. Higher speed at less cost than dot matrix printers. Lower your cost of ownership with total micro-based diagnostics. If you want "plug in" peripheral independence, call toll free **(800) 327-3955.**

IEI INNOVATIVE ELECTRONICS INC. 15200 Northwest 60th Avenue; Miami Lakes, Florida 33014 (305) 558-1591 Telex: 807121

32-bit power. $36,000. 60-day delivery.

The Megamini® Model 3220 from Perkin-Elmer is the supermini for the power-hungry.

You want all the minicomputer power your dollar can buy. The Perkin-Elmer Model 3220 is the 32-bit price/performance leader.

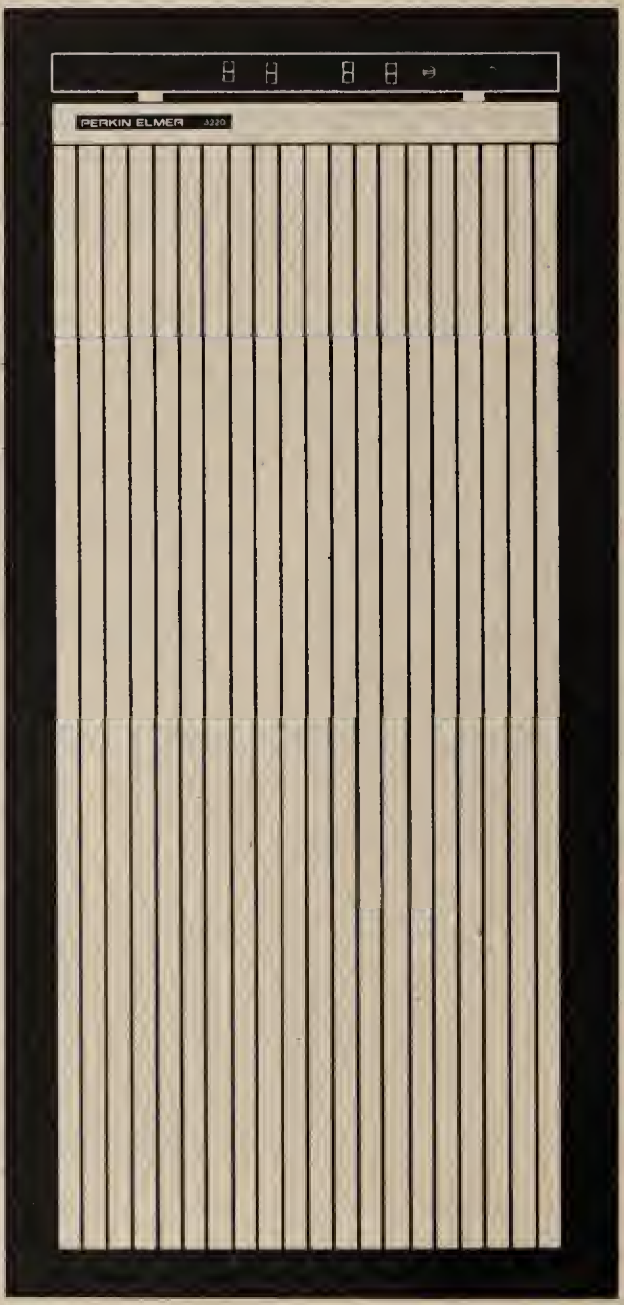
You want memory access power. The 3220 gives you directly addressable high-density MOS ECC memory with from 256K to 4 million bytes. Memory access time is the best on the market for its price—500 nanoseconds without cache memory; 340 with cache memory.

You want throughput power. With the 3220, you can attach more than 1,000 devices on its multiplexor bus with a throughput of 400K bytes per second. An extended direct memory access bus includes seven ports, each of which can serve 16 controllers, providing high-speed direct memory access with a throughput of 8 million bytes per second.

You want operating system power. Up to 255 user tasks can be executed concurrently at user-defined levels of task priority.

You want program development power. Our Fortran VII compiler produces object modules at a speed of 2,000 lines per minute. And with our Multi-Terminal Monitor, you can have 64 programmers working interactively in any mix of these languages—FORTRAN, COBOL, Pascal, CAL MACRO, BASIC II, Coral 66, or RPG II.

You want terminal response power. With Reliance, our transaction processing software, your terminals—up to 128 of them—will respond within two seconds. And Reliance makes operations and program development easy with its query facility, interactive screen forms design and ANSI-standard COBOL.



You want staying power. A billion dollar Fortune 500 company, Perkin-Elmer maintains a worldwide field service operation and offers a variety of support program contracts.

Starts at $36,000 (U.S.). And delivered within 8 weeks. Find out more about the Megamini 3220. Send the coupon or call us.

The Perkin-Elmer Corporation
Marketing Communications
2 Crescent Place
Oceanport, NJ 07757

Please send me your fact file on the 3220.

Name____________________

Title____________________

Company____________________

Street____________________

City____________________

State______________ Zip________

Telephone____________________

CW1201 - 3220

Call toll free 800-631-2154.

In NJ call 201-870-4712.

PERKIN-ELMER

Megamini is a registered trademark of The Perkin-Elmer Corporation.

Open Networking Stymied

X.25 Delay Viewed Hurting Net Users

By Brad Schultz
CW Staff

LOS ANGELES – IBM and the circuit-switched network community hurt data communications users by slowing the spread of X.25, the emerging world standard for linking data terminals to packet-switched networks.

So said executives of companies that offer packet-switched products and services who participated in a recent conference here.

Users suffer on two counts, some participants asserted. X.25 would give users the ability to link data terminal equipment of many different brands, whereas users without X.25 typically are constrained to one or a few brands, they maintained.

And X.25 would give those who must route data through a number of network nodes the advantages of packet-switching, which include help on finding optimum routes and on coping with congested or dead links.

These executives noted that X.25 is a recommendation, not a standard, issued by the Consultative Committee on International Telephone and Telegraph. But X.25 comes with the first three layers of the International Standards Organization's (ISO) model for an "open" network architecture [CW, Nov. 24].

While the ISO develops higher layers of the model, many nations outside the U.S. already rely on X.25 compatibility for their data communications. That is why banks and other organizations based in the U.S. cannot do much business abroad without X.25 interfacing at home, according to Gerard Schreder, marketing vice-president of SESA-Honeywell Communications, Inc.

But IBM's 3270 terminal family is incompatible with X.25, he said, and is presently inappropriate for so-called open networking, which ties together many brands of data terminal equipment to ease communications between different networks. Since X.25 allows open networking, it allows longstanding IBM customers to implement terminals from IBM's competitors.

As IBM chief scientist Lewis M. Branscomb has said more than once this year [CW, Nov. 3], IBM's policy on X.25 is to withhold compatibility in the U.S. until common carriers offer domestic compatibility themselves. IBM does offer X.25 compatibility in some foreign nations.

The common carriers that make more money from voice than data communications are traditionally oriented toward circuit-switching, but AT&T may be developing X.25 compatibility and a host of open networking protocols in its long-awaited Advanced Communications Service (ACS), Schreder speculated.

If so, IBM and other major systems vendors that are also major terminal vendors would treat sudden availability of ACS as an act of war, according to Jacques Arnould, director general of Sesa S.A., which built some of Europe's largest packet nets.

X.25 threatens any major terminal manufacturer, Arnould indicated, that tries to be the only terminal supplier to its customers' networks.

Besides IBM, promoters of two circuit-switched media are lobbying against X.25 by attempting to have the highest layers of the ISO's model for open networking accommodate those media, according to Barry Wessler, a GTE Telenet Communications Corp. vice-president. The model's highest layers concern prioritizing, interpretation and application of data, among other matters.

One of these circuit-switched media is teletex, an electronic message service viewed as a successor to telex and a rival to facsimile.

ISDN Approach

The other cause for pressure against X.25 acceptance is often called the integrated services data network (ISDN) approach, Wessler noted. ISDN involves integration of data, voice, facsimile and other forms of information over circuit-switched networks, he indicated.

Arnould and Schreder told *Computerworld* that the all-digital specialized common-carrier services expected from Satellite Business Systems will not disturb the packet-switched market because the satellite links will serve as point-to-point expressways for large volumes of data and other information. In contrast, packet switching will be the popular way to move data over moderate distances through complicated networks, they maintained.

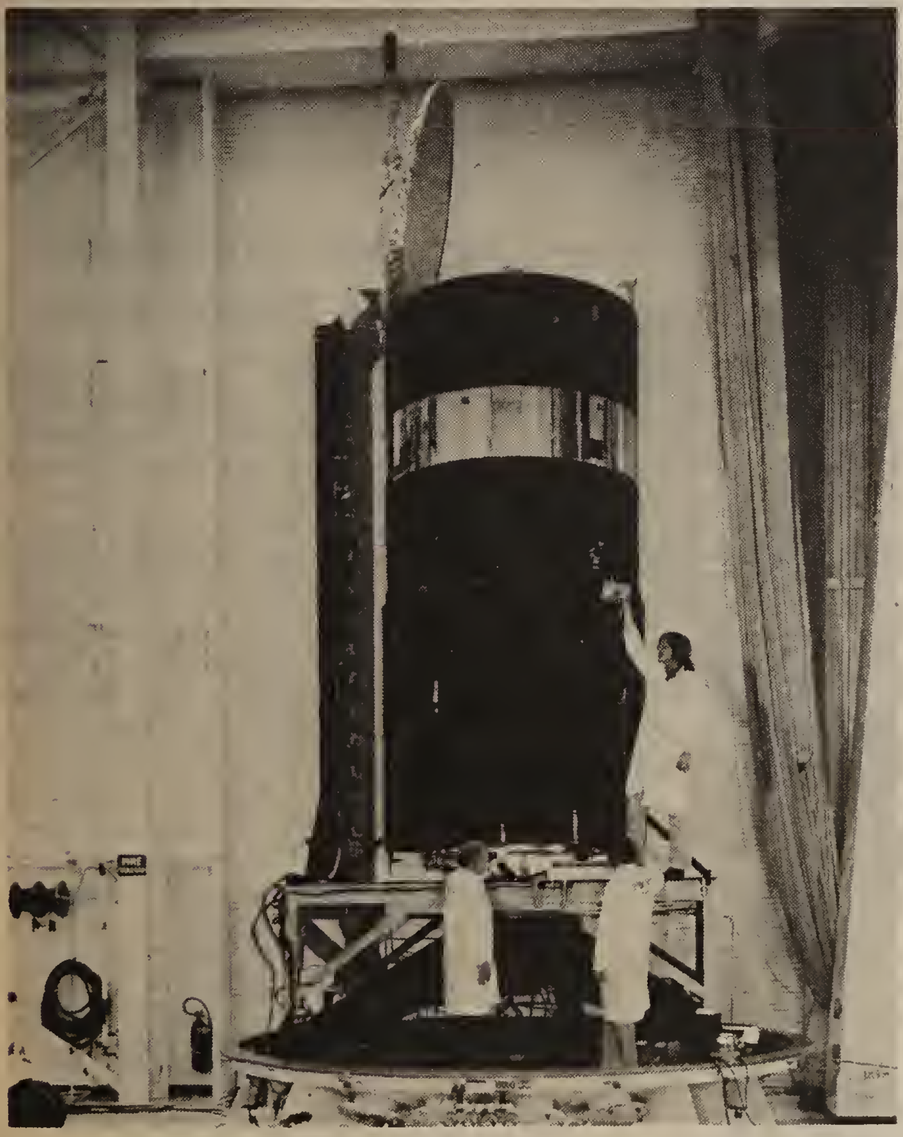
Telex 276 Gains SDLC Capability

TULSA, Okla. – Telex Computer Products, Inc. has announced a Synchronous Data Link Control (SDLC) capability for its IBM 3276-compatible terminal controller.

The Telex 276/SDLC is said to be fully compatible with IBM's program products for SDLC network problem determination and isolation. The stand-alone display and keyboard controller reportedly provides control and multiplexing capabilities for up to seven terminals and printers in addition to its own internal display.

Terminal devices and printers from either Telex or IBM can be attached to the controller in the same cluster, according to the vendor, including the recently announced Telex 281 message printer.

Operating at line speeds up to 9,600 bit/sec, the 276/SDLC costs $4,650, with lease plans available from the firm at 6422 E. 41st St., Tulsa, Okla. 74135.



Countdown

The Hughes Aircraft Co. HS 376 satellite will deliver specialized common carrier services from Satellite Business Systems at megabit per second rates. The carrier's first satellite, SBS-1, was launched into space recently [CW, Nov. 24]. Two more HS 376s, SBS-2 and SBS-3, are planned for lift-offs in the next two years.

Data Briefs

Statistical Multiplexer For Async Terminals

ATLANTA – An $825 two-channel statistical multiplexer designed for use with asynchronous terminals has been announced by Technical Analysis Corp. (TAC).

The SM/2A is said to allow two independent terminals to communicate simultaneously over a single dial-up or leased telephone line, with such features as error detection and retransmission, compression of embedded blank spaces, independent buffering of each device and independent transmission rate selection.

TAC is located at 120 W. Wieuca Road, N.E., Atlanta, Ga. 30342.

Intelligent Terminals Univac-Compatible

BROOKLYN HEIGHTS, Ohio – The Computer Place has announced a family of intelligent terminals called the Q310 that it said is compatible with all Univac CPUs and was designed as an alternative to Univac's U200, UTS400, UTS20 and UTS40 workstations.

The Q310 is available with 64K bytes of random-access memory and starts at $3,000, the vendor said from 4595 Van Epps Road, Brooklyn Heights, Ohio 44131.

Concentrator Aimed At Burroughs Users

NEWARK, Del. – The DM1600B concentrator from Datagram, Inc. has been developed for Burroughs Corp.-oriented systems to allow up to 16 asynchronous terminals to be connected to one computer port.

Using the Poll/Select protocol, the DM1600B supports most standard terminals, according to the distributor, University Computing Services Corp.

A basic four-channel unit with CPU costs $5,650, and four channel increments are $1,750. University Computing Services Corp. is at 286 Main St., Newark, Del. 19711.

Terminal Runs With DEC Gear

ANAHEIM, Calif. — The first in a family of intelligent terminals compatible with Digital Equipment Corp. computers has been announced by the Minicomputer Peripherals Division of Braegen Corp.

The BT-100 CRT terminal features DEC VT-100 emulation, video package, printer port, double size and reverse video characters, user-selectable 80- or 132 char./line, split-screen and scrolling capabilities, composite video output, line drawing and graphic characters, transmission speeds up to 19.2K bit/sec and full duplex asynchronous communications.

The BT-100 is available for $1,995 from Braegen at 3340 East LaPalma Ave., Anaheim, Calif. 92806.

Intelligent Modems Feature Code-Multiplexed Design

MENLO PARK, Calif. — Bizcomp Corp. has introduced the Model 1030 and Model 1031 intelligent modems, which reportedly offer increased capabilities compared with ordinary "dumb" modems.

The 1030, a low error rate modem, has an automatic calling unit and custom BIZ-080 microcomputer configured into a compact FCC-registered unit with auto-answer, auto-dial and auto-repeat dial features. The unit was designed around Bizcomp's Code-Multiplexed Design, which allows intelligent modem control using the same terminal as that for data communication, the firm said.

Code multiplexing enables communications software to be written in high-level language, such as Basic or Cobol, speeding development time, a spokesman noted.

In addition to the 1030 features, the 1031 offers command-selectable dial pulse or tone dialing and self-test for ensuring full functionality. The tone dialing capability makes it suited as a CPT-TWX network interface. Both models feature automatic bit/sec rate acquisition and communications rates of 110-, 134.5-, 150-, 200- or 300 bit/-sec.

The Model 1030 costs $395 and the Model 1031 costs $495 from Bizcomp, which can be reached through P.O. Box 7498, Menlo Park, Calif. 94025.

Teletype 43 Sends Telex

CHERRY HILL, N.J. - RCA Service Co. has taken Teletype Corp.'s Model 43 and enhanced it so it will send telex messages.

The Model 43 Telex features keyboard dialing and an 8K-byte memory with full text-editing capabilities, according to a spokesman. It combines "the convenience of a typewriter-like keyboard with solid-state high reliability," he said.

The unit is available on various lease and lease/purchase plans; on a one-year lease, for example, it costs $119/mo with preventive and remedial service.

The Model 43 Telex can also be purchased for $2,600, RCA Service Co. said from Cherry Hill, N.J. 08358.

"Stat Mux"

A Data Mover Product from DCC

Our STAT MUX can *reduce your communications costs* by combining multiple costly circuits into one circuit, and *improve reliability* with error-free transmission. DCC's Data Movers currently service major operating U.S. Networks.

The CM-9100 Statistical Multiplexer offers:

- **4 to 32 subscriber lines**
- **Synchronous or Asynchronous input protocol**
- **X.25 Level 2 support**
- **Built-in diagnostics**
- **Optional High Speed backup line**
- **No impact to existing terminals, computers, or software**
- **Many other standard and optional features**
- **Immediate delivery**

Thirty-day free trial

For further information, or details about our new 30 day free trial offer, contact the Data Communications Marketing Department.

Digital Communications Corporation

A M/A-COM Company
11717 Exploration Lane
Germantown, Maryland 20767
(301) 428-5600 TWX 710-828-0541

Atten: Data Com Marketing
Please send me more information on DCC's Data Movers.

Name ______

Address ______

______

City ______

State ______

Zip ______

Digital Communications Corp.
11717 Exploration Lane
Germantown, Maryland 20767

UL LISTED

Call our authorized representatives:

- Albuquerque, NM (505)-255-6100
- Atlanta, GA (404)-455-1035
- Austin, TX (512)-454-3579
- Boston, MA (617)-459-2578
- Chicago, IL (312)-398-7660
- Cleveland, OH (216)-247-5129
- Columbia, SC (803)-798-8070
- Dallas, TX (214) 661-9633
- Dayton, OH (513)-293-6062
- Detroit, MI (313)-459-9150
- Durham, NC (919)-683-1580
- El Paso, TX (915)-592-2415
- Ft. Lauderdale, FL (305)-776-4800
- Houston, TX (713)-681-0200
- Huntsville, AL (205)-883-8660
- Los Angeles, CA (213)-594-4574
- Melbourne, FL (305)-723-0766
- Minneapolis, MN (612)-941-8697
- Nashville, TN (615)-482-5761
- New Orleans, LA (504)-626-9701
- New York (New Jersey) (201)-445-5210
- Orlando, FL (305)-425-5505
- San Francisco, CA (415)-964-4335
- Seattle, WA (206)-527-4750
- Tallahassee, FL (904)-878-6642
- Tempe, AZ (602)-967-4655
- Tulsa, OK (918)-252-9646
- Wash. DC (301)-428-5600

Eliminator Ties Controllers

NORWALK, Conn. — Datacomm Management Sciences, Inc. has introduced the ME-31A/B modem eliminator, designed to provide multichannel interfacing capabilities between two front-end controller units for back-to-back test mode operation.

Connection of either controller via pushbutton selection is permitted (on a channel or group basis) to the on-line modem.

In its IBM Teleprocessing Network Simulation (TPNS) mode, the ME-31A/B regenerates data and clock interface signals so that a full 50-ft interface cable may be used at each RS-232 interface.

The price of the ME-31A/B is in the range of $500 to $750 per circuit, depending upon functions required, from Datacomm Management Sciences, 181 Main St., Norwalk, Conn. 06851.

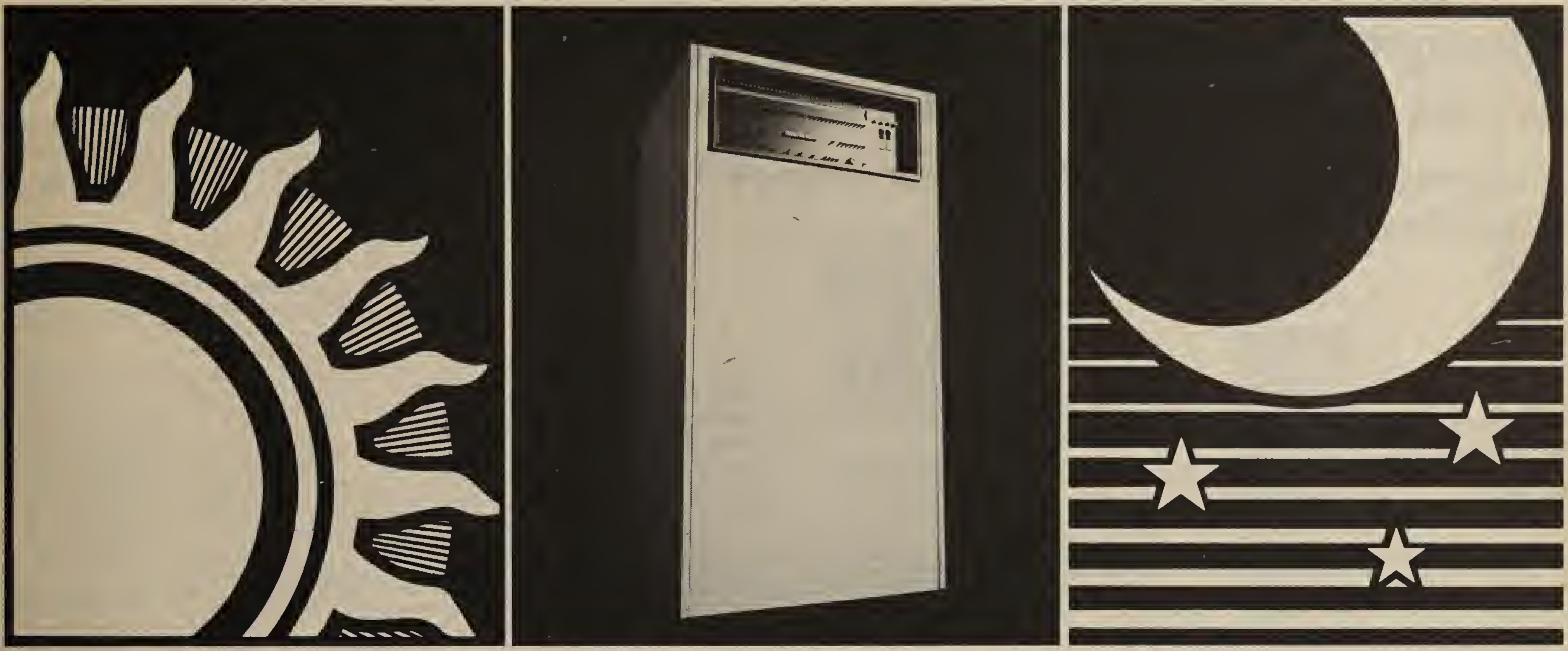
Line Monitor Shows Tristate Signal Status

WOODBURY, N.Y. — A line-powered data line monitor said to provide tristate indication of data communications signal status is available from Remark International.

Previously, line-powered testers would only indicate whether the signal being monitored in the RS-232 interface was above +3V by illuminating an LED, even though the RS-232 standard requires signals to be in the range of +25V to -25V, according to the vendor.

The one-year warrantied Model 41 costs $99, with quantity discounts available, from 4 Sycamore Drive, Woodbury, N.Y. 11797.

AKD
VOLUME DATA
ENTRY SERVICES
HOTLINE
for INSTANT QUOTES
• OMAHA
(800) 228-9410
TWX 9106220199
AMERICAN
KEY DATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106



There are some things in life you can always rely on.

The sun will set. The moon will rise. You can take them for granted. They're dependable. They're consistent. They work. Just like the 1270 Terminal Control Unit from Memorex. There are literally thousands of 1270s functioning worldwide, some for up to seven years without a single service call.

If you think only IBM can make a reliable controller, you haven't heard everything about the Memorex 1270 Model 8. Whether you're starting a system or adding to one already up and running, **the Memorex 1270 Model 8 offers you a total control solution:**

It attaches directly to the byte multiplexer channel of your System/360, System/370, 303X, 43XX or compatible mainframes.

It's the functional replacement for your 270X transmission control units, your 3704 or 3705 communications controllers in the 270X emulation mode and integrated communication adapters.

It's a hardwired control unit that gives you unparalleled simplicity and flexibility.

It's field upgradable to the next larger model, so it grows as your system grows.

But there's more to the Memorex 1270 Model 8 Terminal Control Unit than reliability, flexibility, availability and cost effectiveness.* The specifications tell the whole story. For complete information about the Model 8, other 1270s and the entire Memorex family of display terminals and printers, contact Laurie McNeil at (408) 996-9000 or write to Memorex Communications, 18922 Forge Drive, Cupertino, CA 95014.

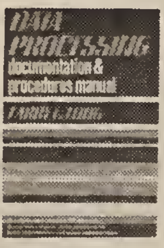
MEMOREX

Communications Excellence

*The 1270 Model 8 is available in the Continental U.S. only. © 1980 Memorex Corporation. Memorex is a registered trademark of Memorex Corporation.

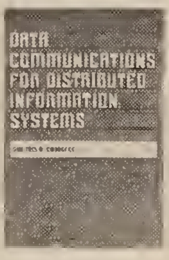
Structured Walkthroughs, Documentation, Reliable COBOL Programs, Data-Base Management, Computer Fraud. . .More Books from Computerworld Books.

. . .And there's no risk—your money back if not satisfied.



HP186
Data Processing Documentation and Procedures Manual
Larry E. Long

Scores of standardized, practice-tested methodologies help you minimize the effort required to develop documentation procedures while maximizing effectiveness and usefulness of the final computer project. This manual brings you in-depth coverage of codocumentation and procedures in the DP environment—system development and implementation, general computer center documentation, and hardware and software evaluation. Plus, there are hints about intermediate, permanent, and project management documentation—space requirements, maintainability, redundancy, structural organization and personnel and much more. **$21.00**



BP225
Data Communication for Distributed Information Systems
Dimitris Chorafas

The increasingly intimate relationship between data processing and data communications is fully elaborated in this book. Aimed at the computer professional, but assuming no extensive knowledge of communications, the book fully covers transaction-based systems. Practical examples include the use of space-, frequency-, and time-division, time slots, intelligent TDM, modems, terminals, multiplexers, concentrators, and front-end tasks. **$24.00**

HP211
Software Reliability Guidebook
Robert Glass

From requirements definition to maintenance, you'll get a complete, conveniently-referenced overview of the most up-to-the-minute technologies for maximizing software reliability. Here are nearly 50 methods for building superior software through each phase of the software life cycle. **$21.95**

HP189
Practical Data Processing Management
Louis Fried

Here's the ideal handbook for the senior executive of data processing—or just about anyone striving for that position. You'll find a practical orientation toward real-world problems and solutions, improving your skills for contributing to the profitability of your firm. It's packed with up-to-the-minute tips, techniques, and proven strategies detailing all the ins and outs of organizational matters, project management, personnel and personnel management and much more. **$17.95**

HP192
Structured Analysis and System Specification
Tom De Marco

Here is the on-the-job guide for today's systems analysts helping you pinpoint problems in present systems and specify and implement new systems. You'll see how to select an optimal target, produce detailed documentation and accurate predictions as well! And you'll also see how to implement the Data Flow Diagram as a tool for structured analysis. Too, you'll see how to develop a structured specification with system models. And what's more, there is information on the continuing analysis function and the ongoing application of structured analysis tools and principles. **$26.95**

HP202
Programming with ADA
Peter Wegner

This is the first step-by-step introduction to ADA, the completely new programming language developed for use by the Department of Defense and all its suppliers. Featuring over 350 graduated examples, this book is a readable and comprehensive primer on the programming language that many experts feel is destined to become the FORTRAN of the 1980's. **$13.95**

ET230
Techniques of Program and System Maintenance
Edited by Girish Parikh, this comprehensive volume includes sections on maintenance problems and perspective, practical tips for maintainers, management considerations and techniques, structured technologies and maintenance, and the future of maintenance. Edward Yourdon, Gerald M. Weinberg, Daniel P. Freedman, as well as Girish Parikh are among the outstanding authors in the computer industry who have contributed to this book. **$25.00**

HP235
Design of Real-Time Computer Systems
James Martin

This is an essential handbook in the expanding field of data processing with conveniently organized contents that reach into most applications in today's business, industrial, and governmental activities. The uses of terminals, communication lines and random access files are analyzed; and advances in time sharing, man-machine conversations, reliability engineering, and degradation procedures are discussed. This book is a companion volume to Programming Real Time Computer Systems. **$25.95**

HP201
RPG & RPGII Programming: Applied Fundamentals: A Job Approach to Learning
William E. Bux and Edward C. Cunningham

Based on realistic business applications, this guide offers you a step-by-step development of 20 programming projects. You'll find ready-to-apply coding techniques relating to actual business concepts and easy-to-follow illustrated examples. You'll soon gain early programming success with the guide's wealth of source data and dozens of sample projects designed to give the programmer on-the-job practical experience. **$16.95**

HM148
FORTRAN: A Structured, Disciplined Style
Gordon B. Davis and Thomas R. Hoffman

Completely compatible with both the WATFOR and WATFIV compilers, the book is packed with thoroughly explained and illustrated example programs. Sample problems are arranged by such functional areas as business and the social sciences. **$16.50**

HP209
Syntax of Programming Languages: Theory and Practice
Roland Blackhouse

Here's an in-depth guide to the BNF description of the syntax of a programming language. The guide emphasizes the practical utility of theoretical insight—including an original and full account of the concept of least-cost repair of syntax errors and its application to error recovery. You get practical information on the ALGOL 60 and PASCAL reports; invariant assertions used in the structured design of algorithms; the graph-searching algorithm; the repair of context-free languages—and much more. **$25.95**

MAIL THIS NO-RISK ORDER FORM TODAY!

Mail to: **Computerworld Books,** 925 North Milwaukee Ave., Wheeling, IL 60090

Please send me the following book(s):

Code	Quantity	Title	Total Price

Add $1.25 shipping and handling for one book and 75¢ for each additional book. If your check is enclosed, we pay shipping cost. ________

Total cost (Illinois residents add appropriate sales tax) ________

15-Day Free Trial! I may read the books for 15 days, and, if not satisfied, return them, and you will refund my money.

☐ Check enclosed ☐ BA/Visa ☐ MC (MC only—List four digits above your name)

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ ☐☐☐☐

If a charge, we need your signature ________ Expiration Date ________

☐ Bill my company (Purchase order enclosed)

☐ Bill me (include company name)

OVERSEAS ORDERS: *Add $8.00/book for Special Handling Air Mail Delivery. Payment in equivalent of U.S. dollars must accompany overseas orders.*

Name ________

Firm ________

Address ________

City ________ State ________ Zip ________

Computerworld Books

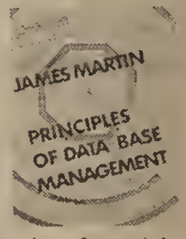
CW12010

HP193
Computer Fraud and Countermeasures
Leonard I. Krauss and Aileen MacGahan

Here's a guide to detecting and preventing computer fraud in every company! Learn the appropriate policies, legal and investigative aspects. Forty-eight case histories provide insight on the various means used to commit computer fraud. Actual company examples explain what items should be addressed in a company's code of conduct, as well as ways to enforce management policy. Plus hiring procedures help you reduce the likelihood of hiring a would-be perpetrator. **$29.95**

HP188
Learning to Program in Structured COBOL
Edward Yourdon, Chris Gane, Trisb Sarson and Timothy R. Lister

Whether you want a guide to the basics of COBOL, to accomplish techniques of structured programming or simply brush up on 1974 ANSI COBOL standard facilities, this guide is for you. This handy volume incorporates proven methods of structured programming to help you develop reliable COBOL programs. And frequent questions and exercises (with answers) and practical hints will help you achieve program efficiency and optimization. You'll see bow to develop basic structures, use auxiliary storage and much more. **$17.95**



HP214
Principles of Data-Base Management
James Martin

Slash searcbing and access time for quick, accurate output. This handbook provides the latest structuring tecbniques for simplifying and standardizing your entire data storage, belping you process ever-growing volumes of data in your system without costly software reconstruction. What's more, you'll see how to insure new accessibility—foolproof security—and logical and physical data structures designed for complete independence. This comprehensive handbook covers every angle of data-base management. **$25.00**

HP183
Structured Walkthroughs, 2nd Ed.
Edward Yourdon

With Edward Yourdon's updated guide, you'll find everything you'll need to know about structured walkthroughs—when to have them, how to conduct them, and how to avoid the variety of psychological problems you're likely to encounter with other technicians, data processing management, programmers and EDP management. The guide covers the tangible benefits of walkthroughs in detecting bugs and potential inefficiencies in the design of a program—as well as some intangible results, including the sharing of technical information and the training of programmers as they foster building of teams. **$13.95**

BP223
Computer Optimization Techniques
William Conley

This book takes a greatly simplified approach to optimization problems and thus lets the computer produce the solution with ease. Computers have become so fast and computer time so inexpensive that it is now possible to state an optimization problem—whether linear or nonlinear—as a highly accurate reflection of reality, then let the computer search all the possible solutions and produce the optimum regardless of the functional form of the problem. This book demonstrates that a nearly optimal solution will be produced for practical problems that necessitate a random search. **$25.00**

HP215
Program Style, Design, Efficiency, Debugging and Testing, 2nd Ed.
Dennie L. Van Tassel

Here's a newly updated guide to the "lore of programming" geared toward helping the seasoned professional develop superior software for every situation. You'll find a complete rundown of suggestions you can use to set up an installation guideline of program style—detailed coverage of what coding techniques hinder a program and how to improve efficiency—on-the-spot methods for getting logic errors out of the program early in the design stage—and much more! **$18.95**

First Commercial User

Firm Has Smooth 4331-2 Conversion

By Tim Scannell
CW Staff

CUMBERLAND, R.I. — When Roger Williams Foods, Inc., a wholesale food distributor here, replaced its aging IBM 370/125-2 computer with an IBM 4331 Group 2 mainframe, the company was prepared for the worst.

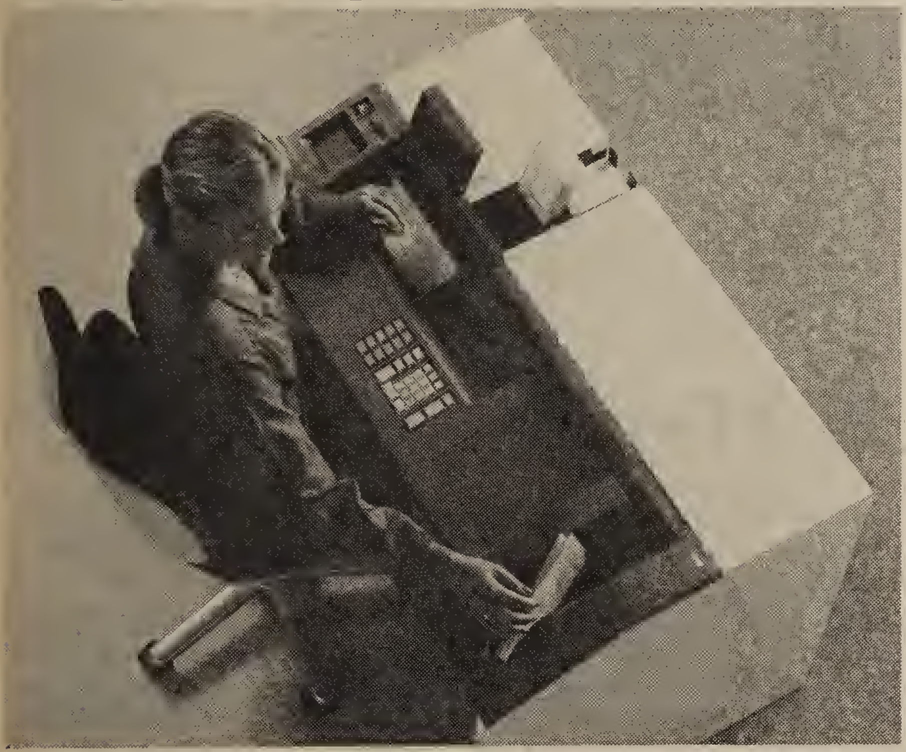
For one thing, the conversion — which occurred in late August and September — could not have happened at a less opportune time. The firm was not only handling more than 10,000 customer orders per day, but was secretly negotiating with another supermarket chain to take over 22 stores scattered throughout New England.

On top of that, Roger Williams Foods — the largest meat distributor in New England — would be the first commercial user of the 4331-2, introduced this year. So the company was rightly concerned with how fast and smooth the machine could be installed, what kind of support IBM would give during installation and how much time the firm's DP staff would need to get used to the new computer.

Of course, the bottom-line worry was if the computer would work at all. And if it did not, how severely would a processing shutdown affect the company,

(Continued on Page 64)

NCR Proof, Encoding Unit Targets Single-Pocket Users



The NCR 760-1000

DAYTON, Ohio — NCR Corp. has announced a proof and encoding machine for the single-pocket, stand-alone proof machine market.

The NCR 7760-1000 can be used by institutions of any size for proof and encoding or for remittance processing, such as credit card billing, lock box accounting, and the generation of small-loan coupons.

The basic unit incorporates over 80 totals, check-digit generation and verification, incrementing serial number and credits-first or debits-first proof, all of which can be programmed by the user to meet individual requirements.

The 7760 also offers full endorsement, which includes consecutive document number, date, bank identification number and customized endorser stamp.

Optional features include a cassette recorder for automatic program loading and OCR-A or OCR-B font in place of the basic E-13B magnetic ink character recognition (Micr) encoding font.

The 7760-1000 costs $8,000, with multiple-unit discounts available. One- and three-year extended term rental contracts, including maintenance, are $293/mo and $266/mo respectively. LNCR is in Dayton, Ohio 45479.

Initializer Runs Floppy Disks With Different Formats

The System 800

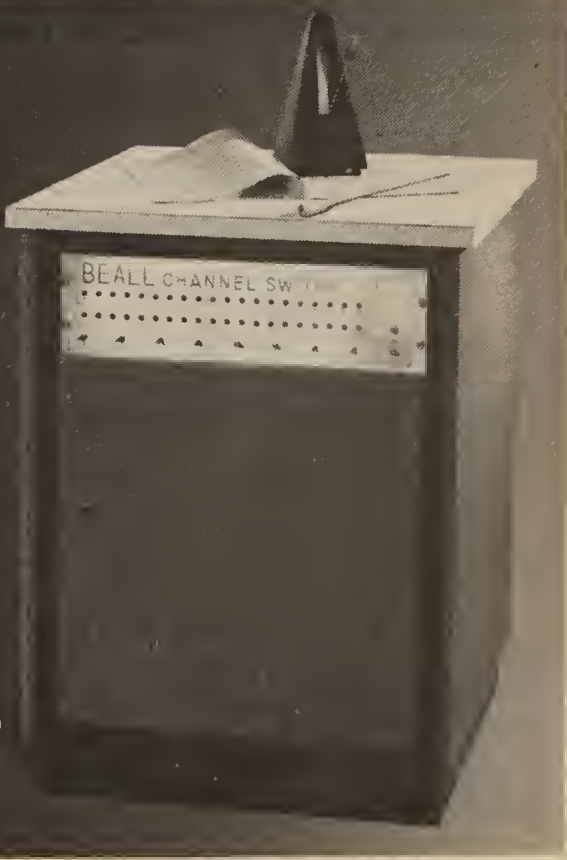
SANTA ANA, Calif. — Media Systems Technology, Inc. (MST) has announced an automatic diskette initializer that simultaneously processes floppy disks of different formats, densities and media under multitasking software.

The System 800 was configured around a Digital Equipment Corp. LSI-4/10 computer, a 1,920-char. CRT terminal, a flexible disk drive and MST's automatic media loader, MST said.

Either 5.25- or 8-in. diskettes can be loaded, initialized and sorted at a maximum rate of 80/hour/station for 8-in. single-sided disks, (45/hour for 8-in. double-sided disks) and 144/hour for 5.25-in. disks (80/hour for double-sided versions), the vendor said.

System 800, with console, media loader, controller and software, costs between $30,000 and $86,000, depending on the configuration.

MST is located at 609 Deep Valley Drive, Palos Verdes, Calif. 90274.



With BEALL Directing, Your Computers Never Miss a Beat

The Beall Channel Switch. Lets you direct critical on-line services to another CPU at the flick of a switch when failure occurs. Allows specific peripherals serve more than one computer. Redrives all CPU signals to give you far more flexibility for physical placement of peripherals.

And Beall does all of this less expensively, more reliably and with less opportunity for operator confusion than anyone else.

We make five basic models to provide up to eight switchable interfaces each of which can be logically connected to as many as eight CPUs.

Want to learn the whole "score?" It's in our new brochure. Write or call for it today.

John Beall & Company, Inc.
9103 Third Avenue ▪ North Bergen, N.J. 07047 U.S.A. ▪ 201/854-3562

Add-In Memory Boards Fit VAX-11/780s

WABAN, Mass. — Shell Computer Systems, Inc. has announced add-in memory boards for Digital Equipment Corp. VAX-11/780 mainframes. The SM256 boards are direct replacements for the DEC M8210 memory module, Shell said.

The SM256 has a capacity of 256K bytes, organized as 32,678 quad words. It is fully hardware, software and ECC compatible with the DEC M8210, the vendor claimed.

The boards cost approximately $10,000 per 1M byte, the vendor said from P.O. Box 36, Waban, Mass. 02168.

Introducing **The Floppy Disk Network**

INSTOR/80 provides turn-key IBM-3741 capability for any system (those above and more). It automatically creates and/or reads the world's most common and reliable disk format. Call or write: 175 Jefferson Dr., Menlo Park, CA 94025. (415) 326-9830; TWX 910-373-2036

instor CORPORATION

ROPES™
ON LINE
PRINTING
UNDER CICS

ROPES™ — Features:
* CICS and Batch Report Generation
* Special Forms Processing
* Reliable, Effective Operation of Printers
* Macro and Command Level Support for Batch & On Line Cobol, PL/1 and Assembler
* Flexible Routing of Reports
* Complete Recovery from CICS and Printer Outages
* ANSI Carriage Control Interpretation and Page Overflow Processing for CICS Printers
* Complete User Documentation
* No Modification to CICS
* RSTU (Available Separately) Allows JES/SYSOUT Printing

FOR FREE INFORMATION, CONTACT:

AXIOS Products, Inc.
2364 Middle Country Road
Centereach, NY 11720
Phone: (516) 588-5461

In Europe Contact
Ordilog
10 Rue Auber
Paris, France 75009
Phone: 226•67•88

For Large-Scale Systems

Preprocessing Data Logger Bows

SANTA ROSA, Calif. — A programmable data logging system, featuring Basic and assembly-language programming, CRT display, full typewriter keyboard and program and data storage capability is being offered by F.I. Electronics, Inc.

Designed for data preprocessing applications for large-scale computers as well as production testing and small-scale process monitoring and control, the Fidac Series 7240 offers a range of plug-in function cards for analog and digital signals, plus minidisk memory and impact printer options. IEEE-488 controller capability allows other compatible instrumentation to be integrated into the system for completely automated electronic test systems, according to the vendor.

Base price for the system, including the analog-to-digital converter, is $4,200 with additional function cards averaging $300 to $400 each. Further information is available from the vendor at 968 Piner Road, Santa Rosa, Calif. 95401.

Calcomp Clear Film Fits Electrostatic Printer/Plotters

ANAHEIM, Calif. — A clear film for its electrostatic printer/plotters has been introduced by California Computer Products, Inc.

Clearplot features a reproduction quality substantially better than other electrostatic plot media, according to Calcomp, and also allows for the overlaying of plots.

The film can be used with all Calcomp electrostatic units and requires no system modifications or sacrifice in plotting speed, the firm said.

Clearplot is available in 200-ft rolls in both 11-in. and 22-in. widths and can be used for seismic mapping, well-logging or check plotting.

A roll of 11-in. film costs $239 and the 22-in. costs $478 from Calcomp at 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Firm's 4331-2 Conversion Smooth

(Continued from Page 63)

which was then moving about 2.5 million pounds of meat per week from its Rhode Island base. As a bit of insurance, Roger Williams Foods arranged to handle its DP workload with a local bank that had just installed an IBM 4331-1 if a failure occurred.

"I honestly expected problems," Scott B. Laurans, the distributor's executive vice-president and treasurer, said. "I just made a decision that I was willing to live with those problems to get the machine in early."

Smooth Transition

Fortunately, the $220 million company's apocalyptic fears of a crashing system and delivery and inventory chaos never came to light. The installation of the 4331-2 processor was accomplished over a weekend. And the process of unplugging the overworked 370/125 and plugging in the new mainframe "went extremely smoothly," Laurans said.

The 4331-2-based computer system currently consists of the processor with 2M bytes of main memory, three 3370 disk drives that offer a total of more than 1.6G bytes of storage, 15 CRTs and two terminal printers. The DP department has about 12 employees, including data entry.

As for problems, the system was only down for about an hour or so during its first week of operation. In fact, the company had more trouble a few weeks ago when it switched from one type of IBM disk drive to another than it did with the installation of the 4331-2, Jim Teixeira, Roger Williams Foods' DP director observed.

Before installing the 4331-2, the firm replaced its 3340 removable disk drives with 3370 fixed-head disk drives. When the 3370s went on-line, the company had some "very strange problems" with the drives themselves, Teixeira said. IBM investigated and subsequently installed a new level of cards in the drives and there have since been no significant problems.

Minor Changes

The firm's DP staff also had to make some minor software changes and adopt a virtual storage access method (Vsam) to accommodate the fixed-block architecture of the 3370 devices, the DP director said. These software changes were not related to the 4331-2 itself, although they occurred at the same time the system was installed.

Before deciding on the 4331-2, Roger Williams Foods' management seriously considered computer systems offered by such companies as Univac and Digital Equipment Corp. "We're not a company that hasn't had its problems with IBM," Laurans stated, referring to the firm's continuing relationship with the computer giant.

In fact, one of the problems the distributor had with IBM was with the original claims made about the 370/125-2 computer. "One of IBM's people was very adamant in his support that the system would handle what we wanted it to do," Teixeira pointed out. However, although IBM believed that machine would fit the company's needs for at least two years, the fast-growing firm outgrew the system in just a few months.

Limited capacity and a series of rapid-fire processing changes killed the 370/125-2, the DP director said. In a short period of time, Roger Williams Foods not only changed from an on-line minimum telecommunications system to an expanded CICS system, but also started doing Cobol applications in what was an Assembler language environment.

"That was what really buried it," Teixeira observed.

As for the company's future, Laurans noted that the 4331-2 processor and additional equipment have actually reduced the company's overall hardware budget for the current year. And the additional computing power will allow the firm to better handle the financial, accounting and supply duties required by its recent food store acquisitions.

Bits & Pieces

Benson-Varian Unveils Metric Printer/Plotters

MOUNTAIN VIEW, Calif. — Benson-Varian, Inc. has introduced the Quadramet series of metric electrostatic printer/plotters, which utilize the firm's Quadrascan writing head to produce a resolution of 100 dot/cnm (254 dot/in.).

The Quadramet 9424 plots at 2.54 cm/sec (1 in.) at a plot width of 59.51 cm/sec (23.43 in.). The vendor's Quadramet 9436 plots at 1.27 cm/sec (.5 in.) across an 89.59 cm (35.27 in.) plot width.

The introduction of the metric electrostatic printer/plotters will eliminate the costly and time-consuming process of metric conversion to English, the firm said.

Deliveries are scheduled for January 1981. The Quadramet 9424 costs $29,500 and the 9436 costs $39,800 from 385 Ravendale Drive, Mountain View, Calif. 94043.

For Easing Growing Pains

Tax Service Indebted to In-House Mini

Special to CW

DALLAS — In more than 20 years of business DP, Joe Melton has seen it all.

In the course of operating his small company, Melton Bookkeeping and Tax Service, and keeping up with clients' demands, Melton has been involved with service bureaus and has used time-sharing and punched tape. Back in 1970, he finally brought it all home by purchasing his own system and found that in-house processing was the only way to keep up with his company's growth.

Currently, Melton is using a 128K-byte Digital Equipment Corp. Datasystem-355 with 10M bytes of disk storage arranged in two 5M-byte removable drives. The system was purchased from Digital Systems of Florida, Inc. (DSI), an integrator that pulled together the DEC package for Melton's business.

The unusual thing about Melton's operation is that since all of his clients have varied needs, he almost has to develop a unique software package to handle a particular client's bookkeeping or tax duties.

Flexible Software

"I have to have a flexible software program that can be user modified to meet every need," Melton explained. "I found that having my own system gave me more growth potential and made it easier to customize my services."

Melton is presently developing an accounting package for a client that will give the firm a complete sales analysis of its entire inventory. The client has five salespeople covering seven states and wants the program broken down by customer and product line.

A program that Melton has already developed, with the assistance of DSI, is an oil and gas program that creates royalty reports and writes royalty checks.

Joe Melton supervises the inputting of data into his in-house accounting system.

Earlier this year, Melton's firm took over the account of a large nonprofit organization that has seven divisions. The organization previously worked with a service bureau that provided only one monthly statement that attempted to cover all of the organization's business activities.

Using the DSI-provided system, Melton reportedly designed a software system that breaks down all of the organization's financial activities division by division. Each division receives a separate financial statement detailing earnings and other parameters.

The 1,500 accounts the organization previously received have been consolidated into 500 accounts. Melton's service also provides a 25-page report that summarizes business activities.

In the area of income taxes, Melton noted that business has never been better, especially since preparer penalties can amount to as much as $500 for simple mistakes, he said.

On-the-Spot Corrections

The DEC computer system allows Melton to control the input and output of each client's tax figures. Errors are caught and corrected on the spot, rather than having to wait for a service bureau to run off the report with mistakes and volley it back and forth through the mails until it is

(Continued on Page 66)

VAX, PDP-11, LSI-11

Interprocessors Link DEC Machines

ORANGE, Calif. — MDB Systems, Inc. has introduced four interprocessor subsystems linking Digital Equipment Corp. PDP-11, VAX-11/780 and LSI-11 computers, as well as a number of interfaces.

For linking two PDP-11 minicomputers, a choice of Interprocessor Subsystem Links is available: the MDB-DA11BJ, providing differential driver/receiver modules for high-speed parallel data transmission up to 3,000 ft; and the MDB-DA11BOI with differential receivers and optically isolated receiver modules for transmission up to 1,000 ft.

For LSI-11 applications, a third subsystem is available: the MDB/MLSI-DA11BOI which links a PDP-11 computer with an LSI-11/2 or 11/23 microcomputer. The fourth system links two LSI-11s.

The MDB-DA11BJ costs $4,875; the MDB-DA11BOI costs $5,275; the MDB/MLSI-DA11BOI costs $4,050; and the MLSI-DA11BOI costs $3,295.

One series of interfaces was designed for use with Intel Corp. 16- and 8-bit single board computers. The line is said to include two General-Purpose Bus Foundation Modules and Universal Wire Wrap Module, all of which require only one card slot in the computer chassis, according to the firm.

The 16-bit General-Purpose Bus Foundation Module costs $295; the 8-bit model sells for $245; and the Universal Wire Wrap Module costs $145.

The second series of interfaces is said to extend the performance of LSI-11/23, LSI-11 and

(Continued on Page 66)

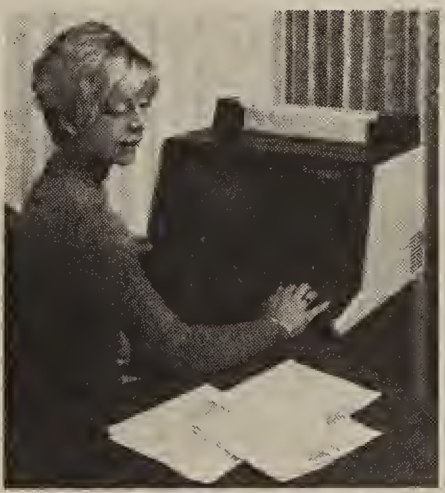
Portable Business System Unveiled

CUPERTINO, Calif. — A fully integrated, portable business computer system for less than $10,000 has been announced by Systel Computers, Inc.

The Report/80 system combines two CPUs, memory, keyboard, video display, two mini-floppy diskette drives, dot matrix printer and two RS-232C ports in a unit weighing less than 50 lb.

Systel supplies the latest version of Digital Research Corp.'s CP/M operating system as a standard part of Report/80, providing automatic compatibility with many prepackaged applications software, according to the vendor.

The unit is available in two models, which differ only in the type of mini-floppy diskette drives used.



Report/80

Model 11, costing $8,950, includes two double-sided, double-density drives for a total of 740K bytes of formatted storage. Model 15, priced at $9,950, includes two double-sided, quad-density drives, for 1.4M bytes of formatted storage.

Both models have an average track-to-track access time of 5 msec and a transfer rate of 250K byte/sec.

Systel is located at 20370 Town Center Lane, Cupertino, Calif. 95014.

THE RIGHT COUPON TO CLIP TO CUT YOUR TERMINAL BUDGET.

Our GT-100 Series of data display terminals is like an automatic savings plan. Because as your terminal needs change, our full-range GT-100 Series, the GT-100A, GT-100E, GT-101 and GT-110, can change right along with them. Each model is factory-upgradeable to any other model in the series. So you pay only for more terminal capability, not another terminal. Which means you save with our low-cost GT-100 Series at the start, and at every step along the way.

For more information, send this coupon to GTC, 14831 Franklin Avenue, Tustin, CA 92680. Or call toll-free. In California: 800-432-7006. Elsewhere in the U.S.: 800-854-6781. Ask for Susan Hart. In Canada, contact Lanpar Limited, 85 Torbay Road, Markham, Ontario, L3R 1G7. 416-495-9123.

The right button to push.™
General Terminal Corporation
GTC®

Name
Title
Company
Address
City State Zip

TEXAS INSTRUMENTS TERMINALS IN STOCK IMMEDIATE DELIVERY

AUTHORIZED DISTRIBUTOR
TEXAS INSTRUMENTS
DATA TERMINALS

silent 700 electronic data terminals
300 Baud
1200 Baud

omni 800 electronic data terminals
Impact Printers

Model 745 Portable
Models 785/787 Portable
Model 825 KSR
Model 743 KSR
Model 783 KSR
Model 825 RO
Model 763 KSR*
Model 781 RO
Model 820 KSR
Model 765 Portable*
Model 733 ASR
Model 820 RO
Model 810 RO

SALES • LEASES • SERVICE
Also from stock: Hazeltine, ADDS, & IBM CRTs. Decwriters. Xerox Daisy Wheel Printers. Vadic Modems. Couplers and floppy discs.
*bubble memory

Westwood ASSOCIATES, INC.
DATA COMMUNICATIONS EQUIPMENT
25 Route 22 E./P.O. Box 10, Springfield, N.J. 07081

Corporate HQ. NJ (201) 376-4242 • **NYC** (212) 662-0060 • **Phil.** (609) 829-7280 • **Pittsburgh** (412) 566-1525 • **Baltimore** (301) 358-7812 • **Conn.** (203) 932-6383 • **Wilmington** (302) 454-1113 • **Miami** (305) 944-1377 • **Sarasota** (813) 924-1058

the terminal connection
We'll connect you with the most quiet, sleek and compact terminals,

GENERAL ELECTRIC
TermiNet® 2000 Printers

The best features of the 43 and LA34 are only a few of the reasons why TermiNet® 2030 will be your next terminal.
Here's a few more reasons:

- It's the quietest, less than 60 dba
- Non Volatile configuration memory
- 7 x 9 print matrix with true lower case descenders and Underline capability
- Full ASCII printset
- Adjustable character density
- Adjustable Line spacing
- Buffered 30 cps nominal print rate
- Bidirectional printing
- Top-of-form and tabbing
- Back or Bottom paper feed
- UL and CSA approved
- Nationwide service

And so much more, all standard. Optional Paper Tractor and Numeric Keypad are available too. But the best feature is its off-the-shelf delivery. **CALL TOLL-FREE TODAY! (800) 323-2135**

MRC connects you to the newest display, printing and communications products from industry leaders like Digital Equipment, General Electric, Hazeltine, Lear Siegler, Penril, Texas Instruments, and others.

AUTHORIZED
GENERAL ELECTRIC
DATA PRODUCTS DISTRIBUTOR

MRC Industries Inc.
660 Busse Highway, Park Ridge, IL 60068
(312) 698-3377
Offices in Dallas, TX and Milwaukee, WI

Stand-Alone File System

On-Line Data Entry Turnkey Out

SANTA MONICA, Calif. — An on-line, microcomputer-based data entry and retrieval turnkey developed by Cuadra Associates, Inc. provides users with a stand-alone system for generating, maintaining and searching in-house, private files of library holdings, legal materials, technical reports, memos, customer records, mailing lists and other types of textual records.

The System to Automate Records (Star) can also be used to support the production and management of small to medium-sized data bases that are to be distributed through one or more on-line services.

Star features full Boolean logic, use of nested parentheses for complex queries, truncated term searching, use of controlled vocabulary, as well as free-text searching, index displays and flexible on-line and off-line print formats.

A typical system includes an Alpha Micro, Inc. microcomputer with 128 bytes of memory, four CRT terminals, a printer, 90M bytes of hard disk storage and software. The hardware costs $35,000 and the software will be in the range of $20,000.

The system can support up to 24 terminals and printers, 1M byte of memory and 2,400M bytes of hard-disk storage and can also run with floppy disks.

Cuadra is located at Suite 12, 1523 Sixth St., Santa Monica, Calif. 90401.

Modular Array Processors Provide High Throughput

NEEDHAM, Mass. — A series of modular array processors tailored for use in systems which have high throughput requirements has been developed by the Computer Products Division of CNR, Inc.

The Mars-232 processor modules are typically controlled by a minicomputer. Because of synchronous hardware design principles which provide software support, the Mars family provides programming simplicity and easy interfacing of compatible processing modules, CNR claimed.

The Data Processor (DP) module is available in two versions: the DP-R, which can carry out a single 32-bit multiply and two 32-bit adds in 200 nsec, or the DP-C, which is capable of four multiplies and six adds in 200 nsec.

The data flow of the system is controlled by the Interface Processor (IP) module and was designed to handle prioritized device interrupt request arbitration and I/O transfers at a 20M byte/sec rate.

A typical mid-size system consists of two DPs and a controlling IP with power supplies and an LSI-11/02 microcomputer. With read-only memory boards in the microcomputer, the system can run stand-alone.

Complete development systems are priced at about $40,000 depending on options, CNR said from the Computer Products Division, 220 Reservoir St., Needham, Mass. 02194.

Tax Service Indebted to Mini

(Continued from Page 65)

correct, he stated.

Even though the bookkeeping and tax services company president is gung-ho on in-house computing, he still advises caution in making the jump from a service bureau or time-sharing to a dedicated minicomputer.

"Look carefully and know what you're getting into," Melton observed.. "Determine your present needs and try to determine your growth and future needs."

In investigating different vendors, Melton stressed the necessity of finding a company that will work hand-in-hand with a company not familiar with the nuances of in-house DP.

In addition, a vendor "should be able to analyze your requirements and sell you a system that fits your needs," he added.

DEC Units Interfaced

(Continued from Page 65)

PDP-11 computers, with models available in Q-bus and Unibus models.

Both MDB DUP-11 synchronous, single-line communications interfaces are reportedly functionally equivalent and software-compatible with the DEC DUP-11.

With data rates up to 500K bit/sec, the interfaces will accommodate Bi-Sync and DDCMP in byte-control (BCP) and SDLC, ADCCP and HDLC bit-oriented protocol (BOP).

The Q-bus model costs $950 and the Unibus model costs $1,200 from the firm at 1995 N. Batavia St., Orange, Calif. 92665.

C.G. DISTRIBUTORS
ADDS TO ITS PRODUCT LINES
ANOTHER QUALITY PRODUCT . . .
HEWLETT-PACKARD
FOR QUALITY & PERFORMANCE IN
INTERACTIVE TERMINALS

2621A
$1,400

2621P
$2,600

Special introductory price to first 50 who reply with check or money order.

CALL TOLL FREE 800-245-1084
IN PA, CALL 412-366-5056

Name ____________________
Title ____________________
Company ____________________
Address ____________________
City ____________ State ________ Zip ____________

Return to: C. G. DISTRIBUTORS, INC.
8400 Perry Highway
Pittsburgh, PA 15237

HEWLETT PACKARD

Quality salespeople looking for a good opportunity call toll free.

S&H has always explored new ways to expand the world of the PDP-11 user. We first expanded Digital's RT-11 into the world of general purpose timesharing with TSX. Since then S&H has been mapping the way for further explorations. Do you know about our latest discoveries?

SYSTEMS SOFTWARE for PDP-11 USERS

TSX-Plus

- Provides efficient, general-purpose timesharing for up to 20 users on 11/23 and 11/34 based systems.
- Up to 56Kb virtual address space per user.
- RT-11 compatible.
- Supports COBOL-Plus, FORTRAN, BASIC, MACRO, PASCAL, DBL, TECO, KED, PIP, DUP, DIR, etc.
- Transparent line printer spooling system with queueing by form name.
- Detached jobs and "virtual" lines.
- Optional logon facility that requires project number and password for system access; maintains system usage charge information and device/file access control.
- Command files with parameters and user created system commands.

COBOL-Plus

- Highest performance of any COBOL system available for the PDP-11.
- Operates with RT-11, TSX and TSX-Plus.
- Automatic program segmentation feature eliminates the need for overlays.
- Fully symbolic interactive debugger.
- Multi-key ISAM files with dynamic B-tree structure — no overflow areas.
- Cursor positioning clauses with ACCEPT and DISPLAY statements.
- ANSI SORT statement when used with TSX-Plus.
- STRING, UNSTRING, INSPECT, CALL, COMPUTE and COPY statements.
- Shared file record locking when running under TSX-Plus.

Over a thousand PDP-11 sites world-wide have already expanded their world with S&H software. This exciting new world awaits you. For a detailed itinerary, contact us now.

s&h computer systems, inc.
1027 17th avenue south
nashville, tennessee 37212
(615) 327-3670

PDP-11 is a registered trademark of Digital Equipment Corporation.

NASA photograph

Portable Micro Series Bows

PROVO, Utah — A line of portable microcomputers, each containing an MPU, CRT display, floppy disk drive and detachable keyboard, is being offered by Zeda Computers International Ltd.

Designed to be easily transported, the 520 series can be powered by standard 110/220 Vac outlets, 12 Vdc or optional internal batteries.

Included in the series are the 522, 525 and 529 with 12-in., 5-in. and 9-in. screens respectively. The software-selectable screen format can be either 16 lines by 56 char. or 25 lines by 81 char.

Zeda Portable Microcomputer

All models utilize a 4 Mhz, Z80A microprocessor with a full-vectored interrupt structure.

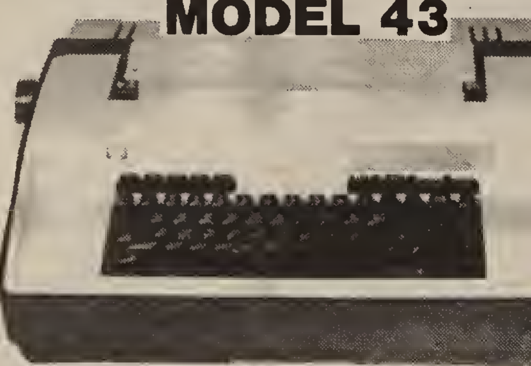
Each unit contains 48K bytes of dynamic random-access memory (RAM) and 2K bytes of video RAM as well as a double-density minifloppy disk controller and built-in, 200K-byte, double-density drive. A 400K-byte quad-density drive is optional.

Up to three external drives can be added, boosting the storage capacity to 1.6M bytes.

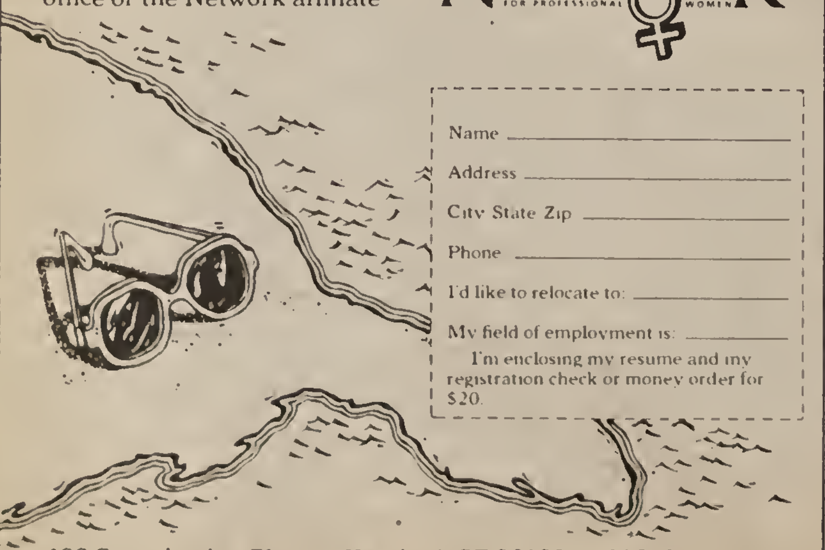
Three ports providing interfacing capabilities include a Centronics Corp. printer port, an RS-232C serial port and a bar-code reader port for a Hewlett-Packard Co. Heds-3000 digital wand. The serial port has a programmable bit/-sec rate up to 42K bit/sec.

The CP/M-compatible Zedos operating system includes all CP/M and Cdos system calls as well as additional Zedos system calls.

All models can be used for tasks including downloading and network processing. The prices are $4,495 for the 522, $3,995 for the 525 and $4,195 for the 529. Zeda is at 1662 W. 820 North, Provo, Utah 84601.



DECEMBER SPECIAL
MODEL 43
With EIA RS232
And 20 Mil Loop
$1195
TERMINAL Systems, Inc.
11300 HARTLAND STREET, NORTH HOLLYWOOD, CALIFORNIA 91605
(213)769-6772/877-1385 Outside California TOLL FREE 800-423-2448
East Coast: 151 Nahma Trail, Medford Lakes, NJ 08055 • 609/953-1248



Do you wish you were in Dixie?
. . . OR MAYBE your heart's in New York, or Nevada, or anywhere else in the U.S.A. National Network for Professional Women, a unique new job referral system, can help you relocate to the "city of your dreams."
Just file your resume with the National Network central office or the Network affiliate agency in your city. For a small fee, we'll process your resume and pass it along to a member agency in the city of your choice.
Don't just dream — act! Return the coupon today for registration.
NETWORK FOR PROFESSIONAL WOMEN
Name ______
Address ______
City State Zip ______
Phone ______
I'd like to relocate to: ______
My field of employment is: ______
I'm enclosing my resume and my registration check or money order for $20.
100 Constitution Plaza • Hartford, CT 06103 • (203) 278-7070
Network memberships are available to qualified personnel agencies. Contact us for information

LSI-11 Gets Flinchester

MOUNTAIN VIEW, Calif. — Scientific Micro Systems, Inc. has introduced a Digital Equipment Corp.-compatible storage system, the FWT 01172 LSI-11, also known as the Flinchester.

Including 8.9M bytes of fixed 8-in. Winchester storage and 1M byte of double-sided floppy disk storage, the Flinchester is available for the PDP-11.

Compatible with standard DEC operating systems RT-11 and RSX-11M, the storage systems operate with floppy diskettes and standard DEC RX01, RX02 and IBM 2/2d formats that are automatically recognized for data input and output. Average access to 8.9M bytes of storage is 70 msec with greater than 500K byte/sec data transfer rates, according to SMS.

The Flinchester systems include disk drives, controller (to interface between the floppy and Winchester disks), interface, power and cabling. Prices start at $6,700 from 777 E. Middlefield Road, Mountain View, Calif. 94043.

Mini Bits

Computer Faire Needs Applications Speakers

SAN FRANCISCO — A call for speakers and session leaders for the Sixth West Coast Computer Faire, to be held here April 3-5, is being issued by Computer Faire, the conference and exposition sponsor.

This annual small-business and personal computing event anticipates a crowd of 24,000 industry people to be on hand. To address these vendors and users, speakers are being sought who have created interesting microcomputing applications or projects, or have developed other information of interest to the small computer community.

The deadline for proposals is Jan. 1. Further details are available from Computer Faire headquarters at 333 Swett Road, Woodside, Calif. 94062.

Audio-Cassette Course Covers System/34

WOODLAND HILLS, Calif. — A self-paced audio-cassette course for IBM System/34 operators and programmers is now being offered by Info III, Inc.

The course, "System/34 Operations and Implementation," covers hardware components, system console, operating system, configuration, hardware and software trouble-shooting, utilities, OCL/-SEU/SDA, principles for efficient operation of a System/34 shop and a number of advanced System/34 tools and techniques. Features such as shop organization, error reporting and patching are also included.

Each lesson begins with a specific set of learning objectives and ends with a complete set of review questions. The course takes approximately 40 hours and a practice diskette is provided with the package for hands-on testing and implementation.

The single-copy price is $695 with discounts available from Info III, 21250 Califa St., Woodland Hills, Calif. 91367.

Controllers Introduced For Perkin-Elmer Minis

SANTA CLARA, Calif. — Spectra Logic Corp. has announced an emulating disk controller for users of Perkin-Elmer Corp. minicomputers.

The single-board Spectra 14 provides emulation of the MSM-80 and MSM-300 Perkin-Elmer disk sybsystems while attaching up to four 80M-byte or 300M-byte compatible drives, Spectra said.

The Spectra 14 will be available Jan. 1 and cost $4,500, the vendor said from 2316 Walsh Ave., Santa Clara, Calif. 95051.

AC Powerline Filters DP Incompatibility

PLAINVIEW, N.Y. — Pilgrim Electric Co. has introduced an ac powerline filter that reportedly was designed to achieve self-compatiblity within a range of DP equipment.

Voltector Multibus Strips are rated 15A, 125Vac and 60 Hz and are available with six, eight, 10 or 12 receptacles.

Prices start at $79.50 for a six-outlet-model, $93 for eight outlets, $105 for 10 and $122 for 12, the vendor said from Pilgrim Electric Co., 29 Cain Drive, Plainview, N.Y. 11803.

FSO/CICS
Full Screen Output
For the CICS User
- SPOOLED INPUT/OUTPUT REVIEW
Scroll, Search for a character string, Page, Set reference points, Delete, Requeue or Print.
- STATUS COMMANDS
Display active jobs, Jobnames on queues, Detailed information about active Jobs or Partitions.
- DATA SET UTILITIES
Perform IBM IEHPROGM facilities on line.
- ALTER/DISPLAY FUNCTIONS
Display or alter virtual storage, Display TCB's, UCB's, Locate modules in LPA or JPAQ and resident SVC's, Express CANCEL a TCB.
TONE SoftwareCorp
Call or Write for Details
1124 N. GILBERT
ANAHEIM, CA 92801
(714) 991-9460
TELEX 181-592

'Very Good Environment'

Industry Spokesmen Welcome Reagan

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C.. — Lobbyists, influence peddlers and other hangers-on are still scrambling to assess their prospects in the wake of Ronald Reagan's-landslide victory over President Carter Nov. 4.

However, optimism verging in some cases on near-euphoria was expressed here last week by spokesmen for the DP and the electronics industry.

"It looks wonderful," exclaimed Kenneth Hagerty, vice-president of government operations, American Electronics Association (AEA). "We think [the Reagan victory] is very, very important. It's just a tremendous change in the direction of the country."

Historic Republic affinity for big business coupled with Reagan transition team statements on tax and regulatory policy have created "a very good environment" for the industry, the Computer and Business Equipment Manufacturers Association (Cbema) said.

A Cbema statement issued after the election proclaimed the Reagan "decisive victory," the shift in Senate majority and "substantial GOP gains in the House of Representatives" as representing "a mandate by the electorate against inflation, excessive regulation and intervention by the government in the affairs of the individual and business."

Contributing to the generally positive assessment of the industry's outlook for the next four years was the perception that businessmen with high-technology backgrounds may have an important role in the Reagan administration.

Although the top 100 or so positions in the administration, including the cabinet, will not be set for at least several weeks, the electronics industry seems to have already deeply infiltrated the ranks of Reagan advisers.

Jerry Sanders, president of Advanced Micro Devices, Sunnyvale, Calif., and Robert Noyce, chairman of Intel Corp., are among members of the Reagan transition task force on innovation, noted Warren Davis, Semiconductor Industry Association (SIA) director of government relations.

The full tally is even more impressive, according to the AEA's Hagerty: "Of the 40 members of the Reagan advisory panel on business, one-third are from high-technology fields — eight from Silicon Valley and four more from electronics firms elsewhere in the country."

(Continued on Page 72)

Small Business Computer Show Well-Received in Las Vegas

By Vic Farmer
Special to CW

LAS VEGAS — If the enthusiastic reception by both exhibitors and attendees here at last week's second annual Comdex Show was any indication, the small computer system industry has found its first real "trade" show.

Comdex is basically a middle-man show, geared to the independent sales organizations (ISO) — the term coined last year by the Interface Group, the show's sponsor, to define that nebulous range spanning systems houses through dealers, distributors, commerical OEMs, reps, computer retailers, turnkey vendors and office machine dealers.

Growth over the last year for the show proved dramatic, with the number of exhibitors doubling to more than 350. The show now has the status of being the second largest computer show in the country, based on exhibitor space.

Attendance Figures

Total attendance, on the other hand, was low, reaching slightly over 10,000. That was a hefty increase from the 4,000 last year, but substantially less than the 80,000 of the top-rated National Computer Conference.

Exhibitors expressed little disappointment in the attendance, however, because most of the attendees were the kind of third-party computer business people they wanted to reach.

The show was all business, both on the exhibit floor and in the sessions, where panelists discussed such topics as the relationship of ISOs and vendors, recession-resistant markets for applications, start-up financing,

(Continued on Page 74)

Apollo Takes Off At Whirlwind Clip

By Marcia Blumenthal
CW Staff

BILLERICA, Mass. — When John W. Poduska left Prime Computer, Inc., a company he helped found in 1972, he fully intended to spend three months skiing.

How much schussing Poduska managed to do remains a mystery, but barely more than three months after leaving Prime last December, Poduska founded Apollo Computer, Inc. and arranged the company's first round of venture capital funding — $1.76 million.

Still moving at a whirlwind clip — just 10 months after the company's founding — Apollo recently unveiled its first product: Domain, a 32-bit minicomputer designed to be configured as a series of computational nodes in a locally distributed network [CW, Nov. 24].

"When you want to get something done, establish a time frame and fit the pieces in," advised Poduska, chief executive officer and president, during an interview prior to Apollo's first news conference last week.

Poduska was a founder, officer and director of Prime, where he was responsible for the development of all hardware and software products and oversaw the company's research and development and planning activities.

Although those responsibilities were challenging, life in Prime's executive aerie ironically offered little chance for advancement. About a year before resigning, Poduska began hearing the entrepreneurial call of the wild.

(Continued on Page 70)

BDS

Line Printers for End Users and System Integrators Improves Profit*

- * **Volume discounts**
- * **Dataproducts Technology**
- * **30-50% savings**
- * **125-1800 LPM**
- * **30-day delivery**
- * **Nationwide service**
- * **Over 50 Interfaces and Controllers to choose from**

To: **BDS Computer Corporation**
1120 Crane Street
Menlo Park, CA 94025
(415) 326-2115
TWX 9103732005 (BDS MNPK)

The Computer System I Use____________

____

Name__________________

Title__________________

Company__________________

Street__________________

City________State______Zip______

Telephone (   )________Ext.______

CW Photo by T. Scannell

Bill Poduska

Apollo Takes Off at Blinding Clip

(Continued from Page 69)

Once Poduska's idea for the company and product crystallized, he wasted no time in assembling a cadre of executives, gathered largely from high-level ranks of Prime, Digital Equipment Corp. and Data General Corp. By combining the views of executives from three distinct computer companies, Apollo has avoided taking a one-sided approach to the marketplace, Poduska said.

"Our team is on the average 10 years older than executives at other computer start-up ventures," he added.

Although the concept for Domain is not new, Poduska maintained it is original as "a product for the marketplace." Until now, the concept of having a large amount of processing power immediately available to a single user was utilized in academic and research environments or in cases where the payoff justified the expense of the application, such as aircraft design, he noted.

Driving the commercialization of the concept is what Poduska described as a "technology surge." Even in the past 18 months, the price and development of microprocessor chips, Winchester disk storage and communications costs have dropped by as much as a factor of five, he noted.

He likened this environment to the one that created an impetus for start-ups in 1972.

Despite the glamour of technological advances, Poduska is quick to point out he is not mesmerized by technology. Instead he is more intent in building a solid business. "We are worrying about the long haul."

And his goal is not modest — to be a $100 million company by 1985. Describing 1980 as the company's development year, Poduska said Apollo expects sales of less than $10 million during 1981.

One excellent lesson he learned at Prime and is putting into operation at Apollo is an emphasis on an end-user sales force. "Fully 30% to 35% of our revenue will be dedicated to the company's marketing effort," he said.

Although seemingly much lower in price, Apollo's Domain is competitively positioned against DEC's VAX-11/750 and the Prime 550. However, Poduska said he sees product lines overlapping rather than directly competing.

Initially, the company will target high-end scientific and engineering users who work in a time-sharing environment. Conceptually, Domain meshes the resource and data sharing of time-sharing and the responsiveness of a dedicated mini. Users do not have to share central processor space and the local network set-up can be upgraded by adding a $35,000 node as needed rather than an entire processing system.

General-Purpose System

However, Poduska sees Domain as a general-purpose system and in the future intends to offer it for commercial applications, a tack taken by DEC with its recent VAX-11/750 offering. Moreover, although not yet available, Apollo expects to add communications features whereby a node would become a gate to a large mainframe or a packet network.

As for manufacturing, Poduska has no intention of going the vertical integration route. Instead, the firm will assemble the components of its product much like "a production assembly process."

While many start-up firms flounder for financing, Poduska's proven track record gave him ready access to venture financing, which after second-round financing totaled $4.4 million.

Five venture firms are included in the financing, but Poduska said the seven partners retain "considerably more" than the 31% ownership left to the founders of Prime after venture financing.

Going public is certainly in Apollo's future, Poduska remarked, noting this could occur as early as 1982.

The seven partners in the Apollo venture are Charles P. Spector, executive vice-president and chief operating officer, who was formerly with DEC; Robert M. Antonuccio, vice-president of manufacturing, formerly corporate director of manufacturing engineering at DG; David L. Nelson, vice-president of systems development, whose experience includes managing special systems programming at DEC and directing research at Prime; J. Michael Greata, vice-president of engineering, who formerly headed Prime's Advanced Systems Development Group; David G. Lubrano, vice-president, treasurer and chief financial officer, who was senior vice-president, of National Medical Care Corp.; and Gerald W. Stanley, vice-president of marketing and customer services.

"Not since the early 60's have MIS departments faced such significant changes as those that are about to occur."

E. Drake Lundell, Jr.
Editor of Computerworld

Computerworld will "Forecast 81" Inside and Out in its combined Year-end Wrap-up Issue, December 29 and January 5, 1981. Ad close is December 12.

From the **Inside**, **Computerworld's** editorial staff will be taking a close look at:

- **IBM after H.**
- **What will users spend in 81?**
- **How to protect your software.**
- **Relational data bases: Fact and Fiction.**
- **DP unionization in 81: What to expect.**
- **What's ahead in local networks.**
- **Network architecture: SNA vs. Others.**
- **U.S. information policy after the election.**
- **Delivery delays: How long must users wait.**
- **Venture Capital: How much for computer firms?**
- **The economic outlook for today's system suppliers.**

And from the **Outside**, industry experts will report on:

- **Strategies for MIS software management.**
- **Hardware and software technology: Six areas to watch.**
- **Data base machines: Where are we?**
- **Integrating word and data processing.**
- **Graphics: What can it do for you?**

This could be the most important issue of **Computerworld** this year. If you're a user who watches the trends, you'll want this guide to the future. And if you market products or services in the computer field, you'll want your ad there. Don't forget, ad closing date is December 12th. Your **Computerworld** representative can give you complete assistance in ad planning. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

BOSTON	CHICAGO	NEW YORK	SAN FRANCISCO	LOS ANGELES
Bob Ziegel	Dave Dolber	Don Fagan	Bill Healey	Jim Richardson
Chris Lee	Bob Ziegel	Mike Masters	Barry Milione	Bob Hubbard
Ed Marecki	Jane Wrightman	Peter Senft	Ruth Gordon	Kathy Knox
Kathy Doyle	(312) 827-4433	Candy Kelly	Althea Gould	(213) 450-7181
Susan Wolffe		(201) 967-1350	(415) 421-7330	
(617) 879-0700				

IBM Realigns Divisions To Handle Semi Operations

ARMONK, N.Y. — IBM has moved control of semiconductor operations from the firm's General Business Group to the Data Processing Product Group.

In announcing the move, IBM Chairman Frank T. Cary said the change in control was aimed at making semiconductor operations a more unified effort throughout IBM. The group, officially called the General Technology Division (GTD), will be responsible for worldwide development and U.S. manufacturing of IBM semiconductor components.

Chip purchases from third-party vendors will still be handled through IBM's procurement department in Poughkeepsie, N.Y., a spokesman said.

Under the reorganization, GTD has been expanded to include semiconductor research efforts in E. Fishkill, N.Y., in addition to its existing control of semiconductor production facilities in Burlington, Vt., and Manassas, Va. GTD will be headquartered in White Plains, N.Y.

IBM Vice-President Jack D. Kuehler has been named president of GTD. He formerly was IBM vice-president and president of the System Products Division. Kuehler will report to Dr. Arthur G. Anderson, IBM vice-president and group executive of the Data Processing Product Group.

IBM Vice-President Thomas M. Liptak, formerly president of GTD, has been named assistant group executive, management services, a new position in the General Business Group. He will report to C.B. Rogers Jr., IBM vice-president and group executive of the General Business Group.

H. Mitchell Watson Jr. has been named president of the Systems Products Division, and will report to Anderson. Watson was assistant group executive, plans and controls, Data Processing Product Group.

Sotheby Computer Auction 'A Total Flop'

NEW YORK — "A total flop" was how the senior vice-president of a Boston computer appraisal firm appraised the Sotheby Parke Bernet Group's recent computer auction.

Except for the lone sale of an IBM "antique," a 370/125 that went for $13,000, the auction did not live up to Sotheby's expectations of selling 13 IBM processors for as much as $1.5 million each.

Discussing the failure of the auction, Paul Blumenthal, senior vice-president of American Computer Appraisal Service, said end users did not bid on the equipment because of the time element involved. "A user is not going to wait around for an auction to buy a computer when he can go directly to a broker or dealer and get one quickly and configured exactly the way he wants it," Blumenthal explained.

Moreover, the introduction of the new IBM 3801 decreased the value of the systems that were offered for sale at the auction.

"The end users just didn't bid," said a disappointed John J. Carr, Sotheby's computer specialist. "They came and they watched, but they didn't bid."

Nevertheless, Sotheby remains optimistic about the future of computer auctions. It has another scheduled Jan. 28.

Forecast Service Eases Decisions

MENLO PARK, Calif. — Gnostic Concepts, Inc. is offering an Electronic Component Price Forecast service designed as a decision-making tool for material managers, business planners and procurement managers.

The service offers timely data on prices and lead times for more than 50 electronic components, including resistors, connectors, backplanes, integrated circuits, MOS memories and microprocessors. In addition, technology trends, inventory conditions, component supplier capacity and other leading market indicators are analyzed in each report.

The annual service will consist of four quarterly reports and unlimited phone and written consultation with the firm's staff. Each report contains short-term and long-term data bases, a strategic management summary, an industrial analysis and separate market profiles of each component.

The price of the service is $12,000 annually, but initial subscribers will pay a special founders' price of $9,800. Gnostic Concepts is at 2710 Sand Hill Road, Menlo Park, Calif. 94025.

VT-52 NEW $1,495
TECHTRAN 8421 NEW $1,295
Dual Tapes with Editing
— IMMEDIATE DELIVERY —
— 30 DAY WARRANTY —

USED LS-120 $1,295
USED TI-765 $1,795
USED TI-745 APL $1,295
USED TI-733 ASR $1,400
USED LA-120 $1,495

TBC
TERMINAL BROKERS COMPANY
Box 312 • 37 Franklin Street
Needham, MA 02192
Call (617) 449-0216
Some Items Limited Quantity

Good performance management takes more than luck

SPM
FOR
CAPACITY PLANNING AND SYSTEM TUNING
QCM's Systems Performance Module utilizes event-driven measurement methodologies to provide most of the benefits of hardware monitors while overcoming the inherent weaknesses of today's sampling-oriented measurement systems.

SPI
FOR
REAL-TIME PROBLEM DIAGNOSIS AND REPORTING
QCM's Systems Performance Interrogator provides dynamic real-time exception reporting facilities and operator displays that enable operators and system tuning personnel to diagnose problems as they occur.

QCM
"the others just don't measure up"

BCO
A MAJOR ADVANCEMENT IN COMPUTER PERFORMANCE EVALUATION
QCM's Byte/SIO Counting Option directly counts SIOs and the number of bytes transfered at the job, device, channel, and control unit levels. This information provides an enormously powerful tool for capacity planning, system tuning, and job accounting.

JAB
FOR
ACCURATE, REPEATABLE AND DEFENDABLE JOB ACCOUNTING
QCM's Job Analysis and Billing is the only system that supplements SMF/RMF data to provide a truly accurate, repeatable, and defendable job accounting and resource management system.

I would like additional information on the most comprehensive and complete family of products in CPE

Name

Title

Company

Address Telephone

City State ZIP

Operating System: ☐ MVS ☐ SVS ☐ VS1
☐ MVT ☐ MFT

DUQUESNE SYSTEMS INC
Established 1970
1511 Park Building
355 Fifth Avenue
Pittsburgh, Pa 15222
(412) 281-9055

Work Force Cut 10%

ICL Ax Falls as Recession Hits

Special to CW

LONDON — International Computers Ltd. (ICL) has blamed high interest rates, inflation, uncompetitive exchange rates and the general climate of recession for its decision to cut its work force by 10%.

The company announced that it will close its factory in Winsford, Cheshire, which currently manufactures the ICL 2946, 2950, 2956 and 2960 range of systems. About 1,500 manufacturing people, mostly at Winsford, will lose their jobs: a further 700 will be lost throughout the company.

According to ICL's director of corporate communications, Alan Benjamin, the ax will fall "by and large in marketing, including technical services."

In the midst of these financial woes, the British government reportedly has decided to award ICL a contract, said to be valued at about $73 million, for the computerization of Britain's witholding tax system.

Although British treasury officials were said to be in favor of opening the bidding to U.S. firms, apparently Prime Minister Margaret Thatcher was swayed by the protectionist "Buy British" movement.

The three U.S. firms bidding on the contract were IBM, Honeywell, Inc. and Burroughs Corp.

Mixed Reactions

Reaction from the trade unions has been mixed. ASTMS, the largest union within ICL (but weak on the ground in Winsford) issued a statement accepting the main reasons stated by ICL for closure and described them as "understandable." But ASTMS warned that the unions would resist the closure.

The AUEW and Tass, the white collar section of the engineering group (union), plan to start a campaign to prevent the closure. The unions will meet in the next two weeks to draw up their battle plans, which includes appealing to the local community for support.

ICL is the town's largest employer and alternative jobs will be difficult to find.

The ICL ASTMS Conservative Trade Unionist (CTU) group has passed an emergency resolution deploring the closure. The resolution was sent to the November meeting of the CTU's national committee.

The CTU issued a statement saying, "We are now seeing the consequences of the government's failure to provide an environment in which new technology can flourish."

Foreign Orders & Installations

J.H. Ryder Machinery Ltd., a Canadian firm engaged in distributing and servicing fork lift trucks, has placed an order for a Univac 1100/60 computer system.

Science Research Council of Daresbury, UK, has retained Cray Research, Inc. in a contract extending to 1983 for the Cray-1S 500 system. The contract is valued at $5.3 million.

Golden Rail, the holiday planning branch of British Rail, has installed a Syfa distributed processing system made by Computer Automation, Inc. The system automatically prints vacationers' itineraries.

Wades Department Stores, the Sheffield-based furniture retail chain in the UK, has placed an order for a Honeywell, Inc. DPS 8/20 large-scale computer system.

Britian's Automic Energy Authority will lease a Cray-1B computer system from Cray Research, Inc., according to terms of a recent agreement. The terms of the lease were not disclosed. The system is valued at approximately $5 million, with installation set for April.

Royal Insurance, a large British insurance outfit, has placed an order for approximately $2 million of advanced Racal-Milgo, Inc. information communications equipment. The new equipment will provide links in a major upgrading of the Royal nationwide computer network, involving nearly 70 branch offices throughout the British Isles.

Nisshin Steel Co. Ltd. of Tokyo, Japan's sixth largest steelmaking firm, has placed an order for four large-scale Univac systems valued at over $9 million.

Industry Welcomes Reagan

(Continued from Page 69)

Added Hagerty, "the new team is reaching out [to] high-technology heads and the likelihood is that a number of those people will get into the administration."

That is "just one indication," he said, "of a very tremendous difference in the interest level of the two administrations. We found ourselves at odds with the Carter administration repeatedly. Either we were on the defensive or they disliked things that we proposed. There were very few times we found ourselves working together for the same goals. That was very unfortunate," he said, "but consistently true."

Exciting Prospect

The most exciting prospect for Hagerty, Davis and their colleagues around the capital was the initial hope Congress would pass the Senate Finance Committee's proposed Tax Reduction Act of 1980 during the lame duck session that began last week.

However, any chance for the bill was lost when Democrats in both Houses returned last Wednesday and promptly vowed to block the legislation during this Congress. House Speaker Thomas J. O'Neill Jr. (D-Mass.) said President Carter would veto any tax cut this year.

But support for the bill by Sen. Robert Dole (R-Kan.), upcoming chairman of the Finance Committee, assures the bill will come up again by next summer, predicted Hagerty. "If this bill passes," he said, "it will be a major benefit to high-technology industries."

The tax reduction bill, whose lame duck passage had gotten the nod from Reagan Chief-of-Staff Edwin Meese and from the president-elect himself, encompasses a number of measures supported by the electronics industry.

The bill would cut capital gains taxes to a top rate of about 21% from the present 28%, provide a 25% tax credit for corporate R&D outlays, and set greatly accelerated depreciation schedules for equipment — a major boon to rapidly changing, high-technology industries.

Besides the tax proposal, it is generally considered the election bodes well for the industry's fight against the Service Contract Act, which would set minimum wage scales for companies servicing federal computers.

One of the greatest opponents of the industry's stance on the law, Rep. Frank Thompson (D-N.J.), chairman of the House Labor-Management Relations subcommittee was defeated Nov. 4. His replacement, not yet determined, and a secretary of Labor more sympathetic to business could lead to a lifting of the Act's provisions.

CICS/VS

COMMAND LEVEL PROGRAMMING COURSE*

December 15-22, 1980 • 9 AM to 5 PM

This course is intended for application programmers destined to develop application programs under CICS/VS using the command level interface.

- Develop and maintain CICS/VS command-level application programs.
- Determine the trade-offs for the best use of the various CICS/VS facilities
- Make use of the basic input/output facilities of BMS as they relate to the IBM 3270 IDS or 3270 compatable terminals

Call COLLECT or write for complete information:

CompEd™
(212) 921-8676
1133 Ave. of the Americas, New York, N.Y. 10036
A subsidiary of Spiridellis & Associates Inc
Early registration recommended
Courses based upon Monday-Friday schedule

yes, Please send more information & registration forms.

Name ____
Co. Name ____
Address ____
City ____ State ____ Zip ____
C-121

Announcing MCBA's December

SOFTWARE SALE

UP TO 50% OFF

From December 1-31 MCBA is offering discounts of between 10% and 50% on all our DEC, Data General, Wang and Texas Instruments business application packages including Phase I of our new DEC Manufacturing System.

Discounts only apply to currently deliverable software developed and supported by MCBA. For details and license arrangements, contact our Sales Department as soon as possible.

MCBA®

Mini-Computer Business Applications, Inc.
117 South Brand Boulevard
Glendale, California 91204
Telephone: (213) 247-9050 Telex: 194188

MCBA™ is the registered trademark of Mini-Computer Business Applications Inc

Now, unleash the true power of your 4300-type processor.

When you chose a new 4300-type processor, it was to upgrade system performance and reduce ownership costs. Yet, if you select the wrong tape subsystem — a subsystem whose performance is not "balanced" with that of your processor — you can actually strangle throughput and reduce system efficiency. On the other hand, if you choose STC's new 4500 tape subsystem, you can achieve a balanced system, and get all the throughput and CPU utilization for which you've paid.

A subsystem matched to your processor.

The new STC 4500 is fully compatible with today's intermediate-sized processors, including IBM 360, 370 and 4300 series devices, as well as other comparable units. But more importantly, the STC 4500 incorporates speeds of 75 and 125 ips, and densities of 800 bpi (NRZI), 1600 bpi (PE) and 6250 bpi (GCR). This combination of high-speed and high-density permits the 4500 subsystem to deliver performance equal to that of your CPU, to help achieve a balanced system.

For example, if you compare an STC 4500 with today's streaming tape devices, there's no comparison at all. In data mode, a streaming tape will typically transfer data at a rate of about 20 kb per second, while the STC 4500 offers a data rate of 468 or 780 kb per second. When you use the STC 4500 to backup a high-performance disk, it outperforms 8809-type devices (see chart below) by a factor of six to one. If you consider total time, this expands to a differential of eight to one, and with 3410 subsystems, the difference is almost nine to one. In sum, the STC 4500 makes frequent disk backup a realistic and cost-efficient alternative — no matter your workload — and at your convenience.

Equally important, the 4500 subsystem also offers enhanced read/write reliability. Users who move from non-STC 1600 bpi (PE) to STC 6250 bpi drives and who take advantage of GCR blocking can reasonably expect an increase in megabytes processed per soft failure of 30 to 35 times that of PE, and an increase in gigabytes processed per hard failure of 18 to 20 times.

Reduced ownership costs.

Older, 3420-type tape subsystems deliver good performance in certain applications. But their price/performance ratio falls far short of that which you'd expect with a 4300-based system. In comparison, the STC 4500 — like a 4300 processor — was designed for use in any office environment. As you can see from the accompanying chart, this means a reduction of 40% or more in space, power, and air conditioning costs, and eliminates the need for raised flooring entirely. And in this age of spiraling inflation, this can be an important long-term consideration indeed.

SPACE/POWER/AIR CONDITIONING

	3803-2 2 3420-6	4550 4554	SAVINGS
POWER (Avg. KVA)	5.12	3.06	40%
BTU/HR. (Avg.)	14,980	9,197	40%
SPACE (Sq. Ft.)	18.4	11.3	40%

Features you get only from STC.

The new STC 4500 also gives you several important features you'll find on no other comparable subsystem.

For one thing, the 4500 is a tri-density subsystem. Thus, it eliminates the need for a separate, additional 800 bpi drive. This helps reduce your initial investment, as well as your total cost-of-ownership.

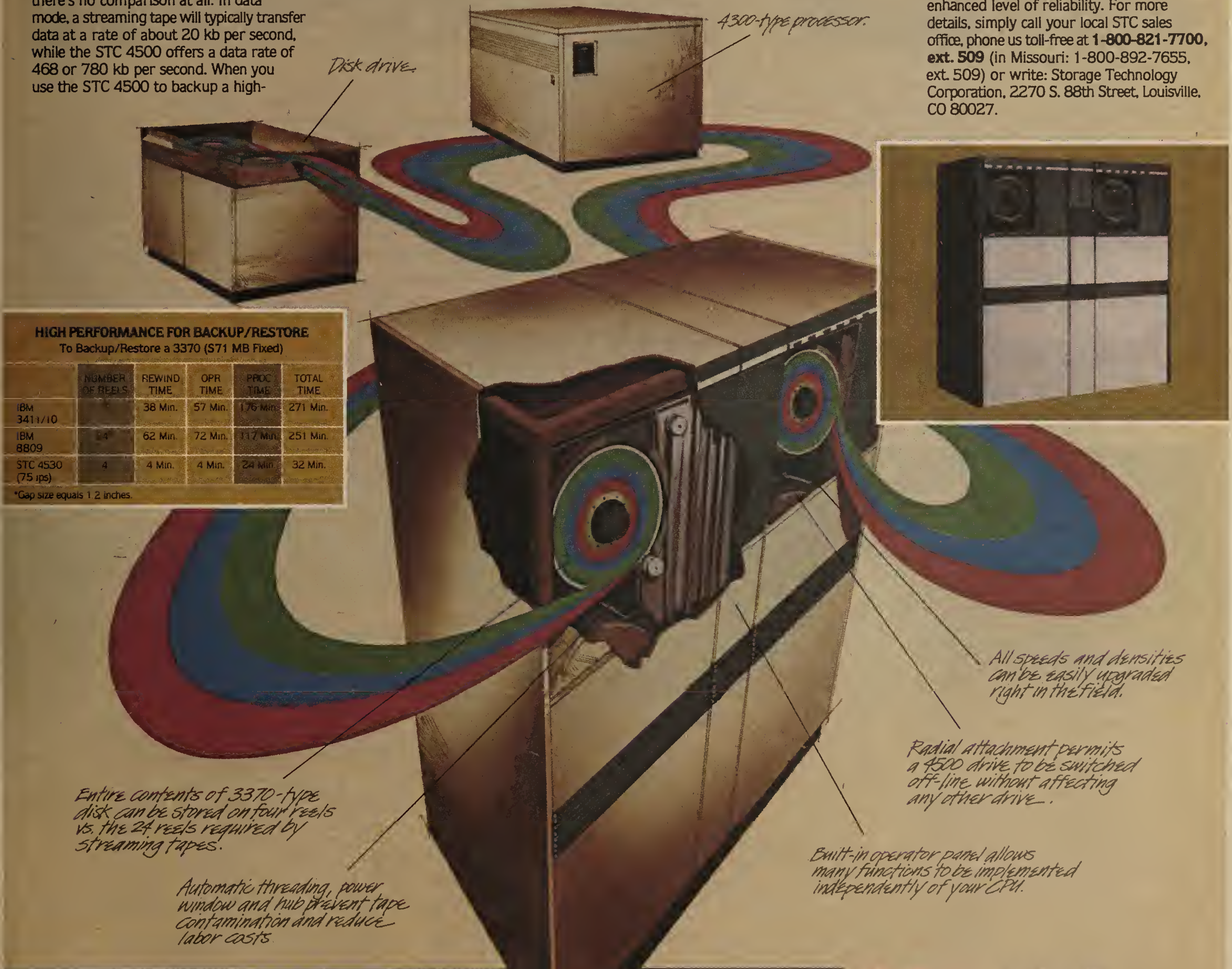
STC's new 4500 tape subsystem can be diagnosed either on-site or remotely. In either event, if one 4500 drive goes down, it can be diagnosed in-line, and serviced off-line without affecting the remainder of the subsystem's operations. Powerful, built-in diagnostics also help assure enhanced data availability. In fact, the STC 4500 has microprocessor-based diagnostics designed to make fault isolation faster and more effective by permitting the subsystem to be exercised in-line. And special "wake-up" diagnostics will exercise the memory, microprocessor, and interface at power-up to assure proper operation.

Proven STC technology.

The STC 4500 was designed around technology that has been tested and proved in some of America's largest, and most demanding, data processing shops. In fact, STC is far and away the world's largest supplier of high-performance tape subsystems for the big processor market. And in the 4500 tape subsystem, we've made all this experience and expertise available to the intermediate system user.

Call now.

Find out for yourself how an STC 4500 tape subsystem can help you achieve a balanced system, reduced cost-of-ownership, new configuration flexibilities and an enhanced level of reliability. For more details, simply call your local STC sales office, phone us toll-free at **1-800-821-7700, ext. 509** (in Missouri: 1-800-892-7655, ext. 509) or write: Storage Technology Corporation, 2270 S. 88th Street, Louisville, CO 80027.


4300-type processor.
Disk drive.
Entire contents of 3370-type disk can be stored on four reels vs. the 24 reels required by streaming tapes.
Automatic threading, power window and hub prevent tape contamination and reduce labor costs
All speeds and densities can be easily upgraded right in the field.
Radial attachment permits a 4500 drive to be switched off-line without affecting any other drive.
Built-in operator panel allows many functions to be implemented independently of your CPU.

HIGH PERFORMANCE FOR BACKUP/RESTORE

To Backup/Restore a 3370 (571 MB Fixed)

	NUMBER OF REELS	REWIND TIME	OPR TIME	PROC TIME	TOTAL TIME
IBM 3411/10	[illegible]	38 Min.	57 Min.	176 Min.	271 Min.
IBM 8809	24	62 Min.	72 Min.	117 Min.	251 Min.
STC 4530 (75 ips)	4	4 Min.	4 Min.	24 Min.	32 Min.

*Gap size equals 1.2 inches.

STORAGE
TECHNOLOGY
CORPORATION
Fulfilling the promise of technology.

P 1701 45 10/80

CLA, CDA Merge

WASHINGTON, D.C. — The Computer Dealers and Lessors Association (CDLA), which hopes to be the single voice of the trade, has been formed by the merger between the Computer Dealers Association (CDA) and the Computer Lessors Association (CLA).

The CDLA will represent companies and institutions that own computer equipment and promises to protect their interests by monitoring vendor policy, pricing, maintenance and special tax considerations. They hope to act as a liaison between the vendor and the end user.

George Heilborn, president of IPS Computer Marketing Corp. of Parumus, N.J., has been elected president of CDLA. The former presidents of CLA and CDA, Edward Cherney and William S. Grinker, respectively, will be cochairmen beginning with the official operation of the group on Jan. 1, 1981.

James Benton, former CLA executive director, will retain the same position in CDLA and remain with his staff in Washington, D.C. Benton will assume the responsibility for industry relations, a major aspect of CDLA's concern, and he will replace Sidney R. Rose as cochairman with Edward Kane of IBM on the joint IBM/CDLA committee. Rose has been named Executive Secretary and will remain in Milwaukee where his office will administer CDLA, work with the Industry Practices Committee and handle media relations.

The CDLA promises to expand its major industry and public relations activities and also to form special interest groups under the umbrella of the larger and stronger trade association.

According to Grinker, CDLA members will have $5 billion in equipment owned in 1980, and there is at least $30 billion owned by private and other entities.

Skyview of Comdex

CW Photo by V. Farmer

Comdex Show Well-Received

(Continued from Page 69)

selling to the fortune 1,000 and DP marketing strategies.

Action on the floor was geared to the small business system middle man, with software announcements of applications and programming tools nearly equaling those of hardware. More than 100 different small business systems were exhibited, ranging from simple desktop systems to multitasking, multiuser systems. Companies such as Digital Equipment Corp., Data General Corp., Texas Instruments, Inc. and IBM exhibited a minimal amount of equipment, concentrating instead on developing their distribution channels.

IBM, for example, limited its efforts to its 3101 video display terminal with only a half dozen units at the booth. DEC, IBM, and TI all had more booth space devoted to conferencing areas than equipment display.

At the Las Vegas convention center, where the show was held, an undercurrent of excitement pervaded the floor. Veterans of the record-breaking 1969 Fall Joint Computer Conference, held in the same hall 11 years earlier, predicted that the industry is entering another boom stage of phenomenal growth potential in the small systems area.

New Companies

DSI Computer Services, Inc. has been established at 428 Fourth St., Annapolis, Md., to provide maintenance to the Washington, D.C./Baltimore, Md. area.

Perex, Inc., a U.S. subsidiary of the British Sintron Group, has been established to market and manufacture a series of computer-related products. They are headquartered at 1798 Technology Drive, San Jose, Calif.

Interface Modules, Inc. will specialize in peripherals compatible with Digital Equipment Corp. computer systems. It is located at 2893 E. La Palma Ave., Anaheim, Calif. 92806.

The formation of **Datasoft, Inc.** has been announced by John Demos, president and chief executive officer of that outfit. The firm will develop and market application software packages for personal and small business computers. It is located at 16606 Schoenborn St., Sepulveda, Calif. 91343.

Croton Research Group, Inc. is a new consulting company with a multidisciplinary staff located at 124 Penfield Ave., Croton-on-Hudson, New York 10520.

Factory-Refurbished PDP-8 and PDP-11 Options from Digital.

Spend less, get more.

All our factory-refurbished PDP-8 and PDP-11 equipment is fully warranted. Every option is carefully reconditioned and inspected, brought up to the latest ECO level and performance tested. But even better, every option is priced well below original list.

Every one a bargain. CPUs: 11/03-KA, 11/03-JA, DS310-HA; Communications: DL11-A, DMC11-AL, DZ11-C, DUP11-DA, KMC11-A; Memory: MSV11-CD, MM11-L, MS11-AP, MS11-CC; Mass Storage: RK05J-AA, RK05F-AA/FA, RP03-AS, RP11-EA, TA11-AA, TU10-EE, RP11-EB; Terminals: LA180-PA, LA180-PD, LT33-DC, LA36-CE, VT50-AA; Miscellaneous: AR11, AR11-KT, KK11-A, KY11-LA, KE11-B, KW11-L, PC11-A, CM8-FB, CM11-FA, PR8-E, VC8-E.

Look into these money-saving values today. For pricing and delivery details, call 800-258-1728 toll-free, 8 to 5 ET (in New Hampshire, Alaska and Hawaii, call 603-884-7240).

Digital Equipment Corporation
522 Amherst Street
Nashua, NH 03063

digital
We change the way the world thinks.

DAS THE DATA TERMINAL AND SYSTEMS PEOPLE

Data Terminals from DASI

MODEL #	PURCHASE PRICE	ANNUAL SERVICE	12-MO LEASE W/SERVICE	MODEL #	PURCHASE PRICE	ANNUAL SERVICE	12-MO LEASE W/SERVICE
TI 745	$1595	$216	$ 90	TTY 43 AAK	$1350	$220	$ 70
TI 765	2695	312	135	HAZELTINE 1420	950	180	62
TI 810 PKG	1955	312	110	GE 2030	1450	230	80
TI 820 PKG	2295	324	100	DIABLO 630	2430	330	120
DEC LA 34	1095	198	65	DIABLO 1640	3195	363	160
DEC LA 120	2495	330	135	DIABLO 1650	3295	363	165
DEC VT 100	1795	187	95	HP 2621A	——	192	80
VISUAL 100	1595	187	80	HP 2621P	——	324	150
LSI ADM 3	850	180	50	RIXON 212A	895	82	50
LSI 31	1370	286	75	AJ 1234/1256	895	82	50
LSI 42	2095	330	105				

• Quantity discounts available • 5% Discount C.O.D. • DASI is nationwide with nationwide service • Local stocking warehouses • Complete line of supplies

Corporate Offices: Cole Rd. & Camden Ave., Blackwood, N.J. 08012
(609) 228-0700. Toll Free (800) 257-7748 In New Jersey (800) 232-6510

District Offices Atlanta—(404) 449-5435 • **Boston**—(617) 769-6420 • **Chicago**—(312) 967-0440 • **Cleveland**—(216) 473-2131 • **Dallas**—(214) 256-5536 • **Denver**—(303) 741-2922 • **Detroit**—(313) 589-1409 • **Houston**—(713) 682-5965 • **L.A.**—(213) 538-4100 • **Milwaukee**—(414) 963-9008 • **Minneapolis**—(612) 854-4466 • **N.J.**—(201) 227-8880 • **N.Y.C.**—(212) 564-9301 • **Philadelphia**—(215) 667-8315 • **Phoenix**—(602) 263-5034 • **Portland**—(503) 644-8600 • **Rochester**—(716) 377-2060 • **San Antonio**—(512) 655-5216 • **S.F.**—(415) 872-1811 • **Seattle**—(206) 251-5070 • **Wash., D.C.**—(301) 459-3377

TWX # 510-686-2932 **GSA Contract #GS-00C-02234 3-31-80**

OUR CONTROLLERS ARE BEST ACROSS THE BOARD.

DATUM MADE'EM.

Made 'em stand out from all the rest.

Because when they all stand together, you discover something special: nobody but Datum offers such an outstanding selection of disk and tape controllers.

All from a single source.

A SPECIAL THREE-PART PRESENTATION.

Datum does it by presenting you with a broad choice in embedded and external disk and tape controllers.

For your initial choice, Datum presents you with disk and tape controllers for DEC LSI-11, PDP-11 and VAX 11/780 systems. All feature both software and diagnostic transparency.

And for your next choice, Datum presents disk and tape controllers for the Data General 602X-compatible Nova and Eclipse systems.

And for yet another choice, Datum presents tape controllers for Hewlett Packard, IBM Series 1 and Interdata systems.

Taken together, these components represent the broadest line of disk and tape controllers around. And together with Datum's broad selection of tape and disk drives, you can have the most complete up-to-date minicomputer storage system.

From Datum: the single source.

NOT JUST QUANTITY—QUALITY TOO.

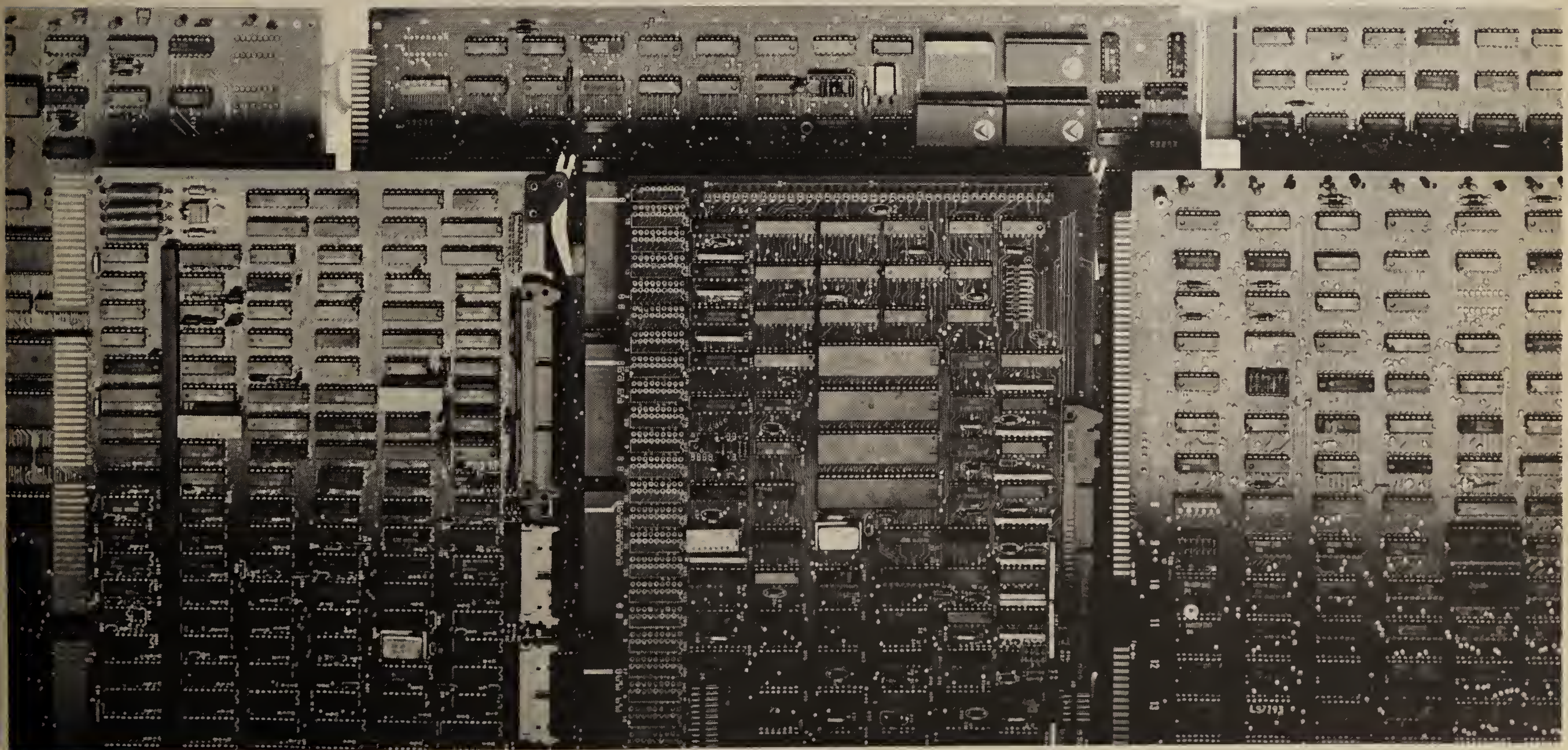
And in all senses of the word. Because Datum knows that there's more to running a quality business than having lots of product on hand. After all, meeting people's needs is what business is all about. And the people at Datum are making it their business to meet the needs of your business.

And to prove it, we'll back up every purchase. You've got our word on that. Because we guarantee you total service from full technical and application assistance to on-site installation. And our maintenance programs service all Datum products. It's our way of showing you that we do mean business.

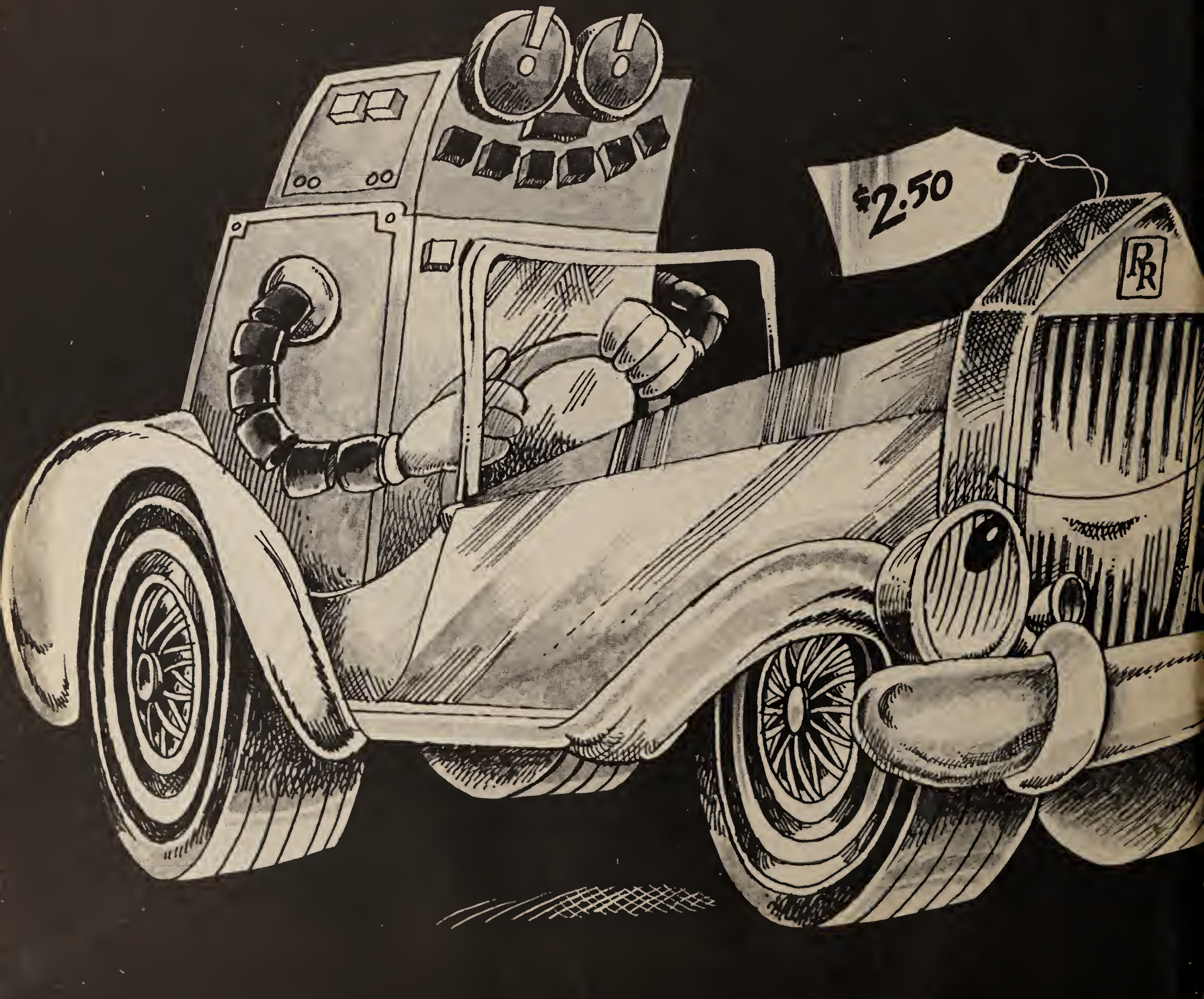
Let's get together. Call us today.

Datum, Inc., Corporate Headquarters: 1363 South State College Blvd., Anaheim, California 92806, Telephone: (714) 533-6333, Ext. 207, TWX: (910) 592-1289, Telex: 68-5579.

Datum
Storage Systems Division



"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."

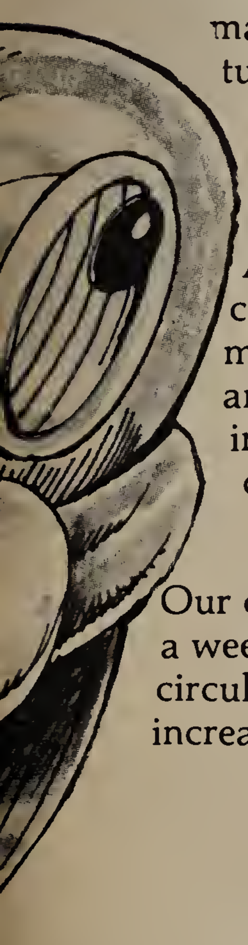


Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

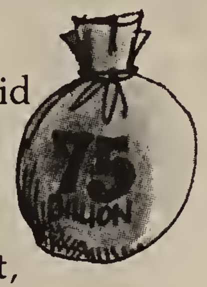
We are CW Communications/Inc. and despite our youth (we'll be 13 this year) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear). In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.



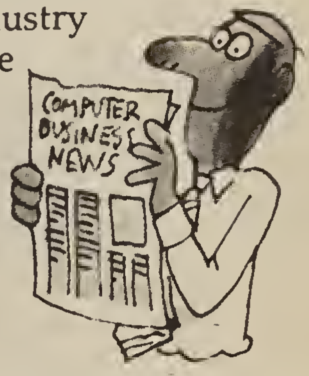
This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.



A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is *COMPUTERWORLD*, a weekly newspaper with a growing all-paid circulation in excess of 105,000 (quite an increase from our modest 7,500 in 1967).

COMPUTERWORLD serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.



COMPUTER BUSINESS NEWS is our weekly newspaper for executives in the U.S. computer industry whose organizations are involved in the manufacture, integration and resale of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.

The latest phenomenon of the computer industry is personal and desk-top computers and we're covering it with our newest publication, *INFOWORLD.* We report from the user's point of view – with product ratings, and information on using small computers in business and at home. It's a paid circulation, bi-weekly newspaper, and the only publication of its type – located right in the middle of silicon valley — where it's all happening.

The United States alone accounts for nearly half of the worldwide computer market, but billions of dollars are spent by foreign computer people for American-made computers and computer products. And our publications penetrate those marketplaces, too.

We are publishers of newspapers and magazines in the following markets: Australasia, West Germany, United Kingdom, The People's Republic of China, Japan, Brazil and Mexico.

And we provide U.S. advertising representation and editorial services to publications in the following countries: Italy, France, Greece, The Netherlands, Sweden, Argentina, Chile and Southeast Asia.

Our International Marketing Services Department can give you one-stop advertising service for any or all of these publications – including translation and production services. We'll even bill you in U.S. dollars, so it's as easy as advertising in U.S. publications.

Computing is an exciting industry, with a unique need for information. And the publications we produce provide that information to hundreds of thousands of computer people around the world. They are excellent vehicles for reaching these people with your advertising message, and we'd be happy to give you more information on any of them. Just call or write, Roy J. Einreinhofer, *Vice President, Marketing.*

CW COMMUNICATIONS/INC.
375 Cochituate Road, Route 30
Framingham, MA 01701 (617) 879-0700

IDC Expects 'Staggering' Desktop Growth

WALTHAM, Mass. — The expected growth for desktop computer systems is "staggering," according to International Data Corp. (IDC), which forecast an increase in the worldwide installed base from 535,000 units in 1979 to more than 5.2 million units by year-end 1984.

The U.S. installed base will jump from 371,000 units in 1979 to about 3.1 million units by 1984, with shipments rising from 200,000 in 1979 to 849,000 in 1984, the market research firm predicted in a report entitled "The Small Computer Market."

Once geared toward the home computer enthusiast, desktop systems are finding their way into the business community more and more. "Today," IDC noted, "desktops have the capability to become multiuser systems with up to 192M bytes of on-line storage, multiple terminals and other I/O peripherals on a single base system. The cost can range from less than $5,000 to as high as $10,000."

The business/professional market segment is the most important one for desktop computers at present and will remain so in the future, IDC said, pointing out that there are presently more than 13 million small businesses in the U.S. Within the U.S. market, the business/professional segment will show a 52% compound growth rate for the period from 1979 to 1984.

In terms of percentages, the business/professional segment will account for 54.8% of the total U.S. installed base by 1984 — representing some 1.7 million units. Average prices for business/professional systems are approximately $4,700, although basic systems may range anywhere from $1,000 to $17,000.

The home/hobbyist area, once identified as the main market for desktops, has not shown the spectacular growth that was predicted. In fact, IDC revised its forecast downward as last year's shipments fell short by 16,000 units from its original forecast for this market.

IDC forecast the gradual end of the differentiation between desktops and traditional small business computers, such as the IBM System/32. The boundary between these products has become increasingly hazy as vendors like Radio Shack, Apple Computer, Inc. and Commodore Business Systems, Inc. have upgraded their systems to appeal to the business community. Similarly, many of the vendors in the traditional small business computer market are now extending their products downward.

Upward Compatibility

IDC sees the presence of an upwardly compatible line of computers that will run right into the larger, more powerful systems becoming very important to vendors in the coming years. At present, only four vendors have such a line — IBM, Wang Laboratories, Inc., Digital Equipment Corp. and the Hewlett-Packard Co.

While the desktop computer is "currently riding high," IDC warned there will be some problems to watch out for in this market:

- First, the rising cost of doing business has eaten up much of the cost savings that advanced technology has developed. Consequently, IDC sees no dramatic price declines in the foreseeable future.
- The software for desktops is still not up to par, IDC said. Many users complain of having to rewrite substantial sections of programs in order to get them to run properly.
- Component parts — most notably floppy disk drives — have been in short supply.
- Finally, IDC expects an industry shakeout by 1983, resulting in many companies closing their doors, as well as a rash of acquisitions.

Taking a look at the vendors, IDC said Radio Shack led the pack with 81,000 systems shipped in 1979. Apple was a distant second with 32,000 units shipped, followed by Commodore with 19,000 and HP with 10,800.

At the dollar value of shipments, however, HP was at the No. 1 position with $181.9 million (24% of the market) and IBM was in the No. 2 spot with $110.5 million (14.6% of the market).

The entire "Small Computer Market" is available for $3,500 from IDC's Corporate Planning Service, 214 Third Ave., Waltham, Mass. 02254.

The Situation:
Soaring demands of
end-users are overwhelming
data processing.

CINCOM USER INFORMATION SERIES 2

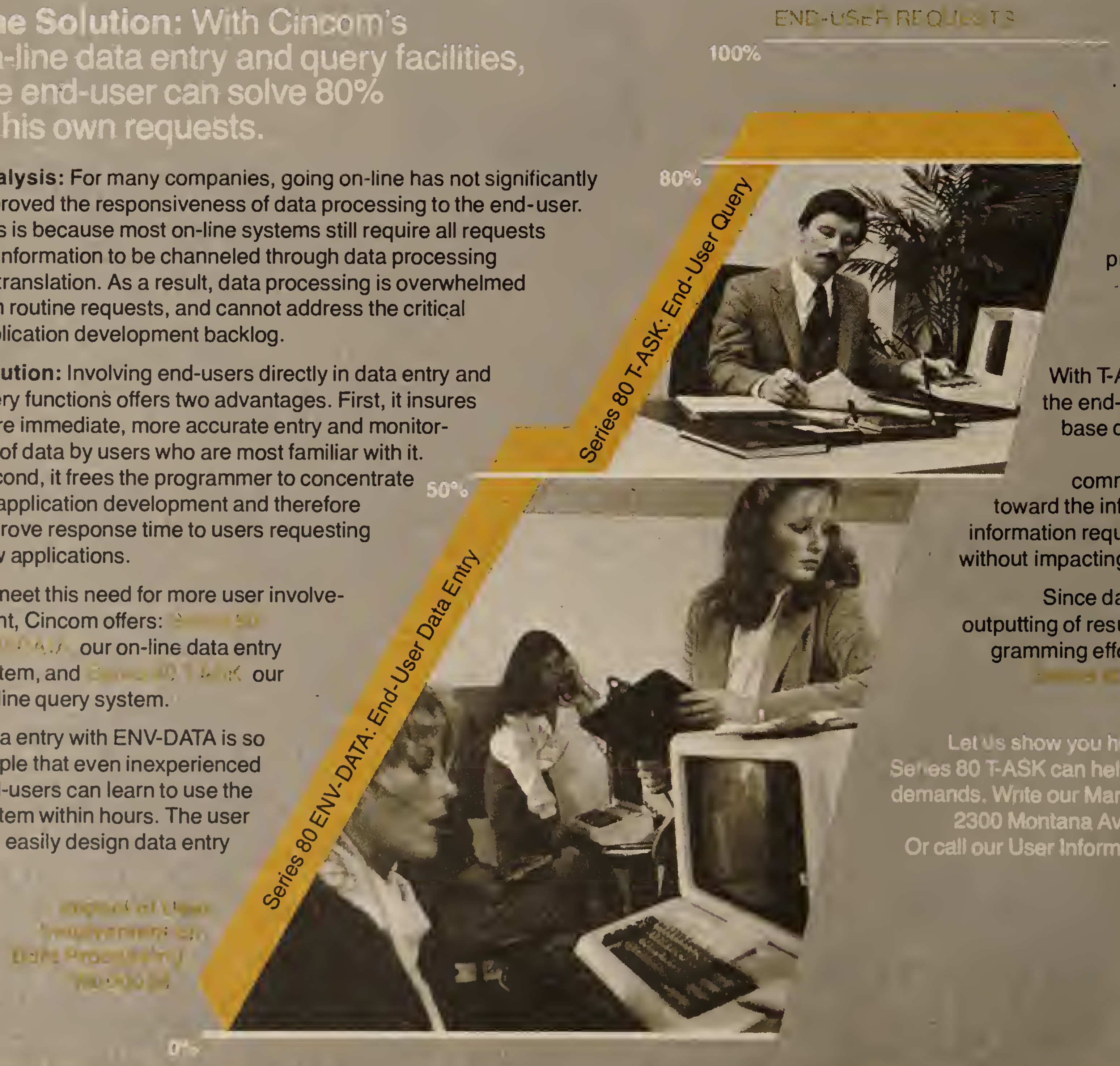
The Solution: With Cincom's
on-line data entry and query facilities,
the end-user can solve 80%
of his own requests.

Analysis: For many companies, going on-line has not significantly improved the responsiveness of data processing to the end-user. This is because most on-line systems still require all requests for information to be channeled through data processing for translation. As a result, data processing is overwhelmed with routine requests, and cannot address the critical application development backlog.

Solution: Involving end-users directly in data entry and query functions offers two advantages. First, it insures more immediate, more accurate entry and monitoring of data by users who are most familiar with it. Second, it frees the programmer to concentrate on application development and therefore improve response time to users requesting new applications.

To meet this need for more user involvement, Cincom offers: Series 80 ENV-DATA, our on-line data entry system, and Series 80 T-ASK, our on-line query system.

Data entry with ENV-DATA is so simple that even inexperienced end-users can learn to use the system within hours. The user can easily design data entry screens, then enter, edit, and store the data for later processing.



As a result, end-users can solve their own routine requests instantly. And your programmer can begin solving the tremendous application backlog and provide better service to the end-user.

With T-ASK's user friendly language, the end-user can interrogate the data base directly without programming. A series of easily understood commands guides the T-ASK user toward the information he seeks. Complex information requests are satisfied in minutes, without impacting data processing schedules.

Since data input, data validation, and outputting of results comprise 80% of the programming effort, Series 80 ENV-DATA and Series 80 T-ASK dramatically improve the information flow to users.

Let us show you how Series 80 ENV-DATA and Series 80 T-ASK can help you meet soaring end-user demands. Write our Marketing Services Department, 2300 Montana Avenue, Cincinnati, OH 45211. Or call our User Information Hotline: 513/661-6000.

Cincom Systems, Inc.

To Take on IBM 3081

Univac Hints at Joining Mainframe Skirmish

By a CW Staff Writer

BOSTON — Will Univac join the large mainframe skirmish precipitated by the latest announcements from IBM and Amdahl Corp.?

The Univac division should not be counted out of any price/performance contest, according to Gerald Probst, newly elected president and chief operating officer of Sperry Corp.

Probst assured financial analysts here recently that Univac would remain competitive in the mainframe market and that the IBM and Amdahl announcements "will not force us to modify the future development of Univac products." Specifically, he said:

- On IBM's announcement of the 3081: "The IBM 3081 does not constitute a big threat to the Sperry product line in terms of price or performance. We have products on the drawing board that will be highly competitive with the 3081."
- On Amdahl's announcement of the 580 series: "Amdahl is shooting for a much higher market than Sperry cares to participate in. They are approaching the supercomputer market, and there is no magic in what they are doing."

Probst also had tough words for AT&T's movement into data processing; "Just another competitor. Sperry can compete against them as we can compete against anyone else. They don't frighten us."

Sperry's second-quarter earnings growth of 15%, an increase of 19% in company-funded R&D expenditures and a strong order backlog at Univac were evidence of Sperry's commitment to and acceptance in the marketplace, Probst said.

Probst added that the company next spring would build a 47,000-sq-ft addition to its research center in Sudbury, Mass., and that its $50 million addition at the St. Paul semiconductor fabrication plant was "only the tip of the iceberg."

Software Packages Predicted To Outsell Custom Products

MINNEAPOLIS — This is the year when revenues from packaged software will exceed that of custom products, a vice-president of Informatics, Inc. said here recently.

Speaking before a symposium on the use of computers for managing shareholder accounts, James R. Porter noted that industry statistics from Input, a research organization, show standard and readily available software packages will generate revenues of approximately $2.25 billion in 1980, slightly edging revenues from custom products.

Forecasts show the spread between the two types of software reaching almost $3 billion by 1985, with standard software valued at $8 billion and custom products at $5 billion.

"These statistics indicate two trends in the computer software and services industry," Porter said. "users are beginning to see inherent productivity benefits to using readily available and standardized packages because the development costs are spread over a larger base and their personnel costs can be held more constant.

"Second, packages today are much more versatile than they have been in the past, affording users with a combination of more powerful software and 'friendly' access to information and programs," he continued.

These new economics in software hold promise of breaking the programmer bottleneck that currently exists in the industry because of a shortage of people.

"Today more than half a million people are classified as programmers. They are working against a backlog of an estimated 10 million programs," he said.

"Demand for these people is growing at 20% per year; consequently, their sales are growing are more than 16% a year. If the colleges were producing enough new programmers, we could live with this situation, but they're not. Of the 8,300 computer science students expected to graduate in 1981, the 30 to 40 large companies among us in the computer industry will absorb almost all."

He said it takes from three to five years for the best programmers to become totally productive.

CDC Settles for $2 Million In Washington Transit Lawsuit

WASHINGTON, D.C. — Control Data Corp. has settled for $2 million in a suit involving the Washington Metropolitan Area Transit Authority.

CDC said it was hired by the Washington agency in the early 1970s to provide a computerized fare collection system for the city's subway line. CDC contended it also had a contract to build the system, but that contract was given to a San Diego-based firm, Cubic Corp.

In May 1975, CDC filed a $14 million suit against the authority, and in August 1978 it filed suit against Cubic Corp. seeking damages from both. In March 1979, the authority filed a $34 million countersuit against CDC.

Earlier this month, CDC announced that the transit authority agreed to pay the computer firm $2 million for "costs incurred during contract performance," and the two firms agreed to withdraw all claims with each other. CDC also dropped its suit against Cubic Corp.

Supershorts

Control Data Corp. has established a domestic distributor program to handle the marketing of magnetic recording media, produced by the company's Business Products Division, to end users of computer products and systems.

— — —

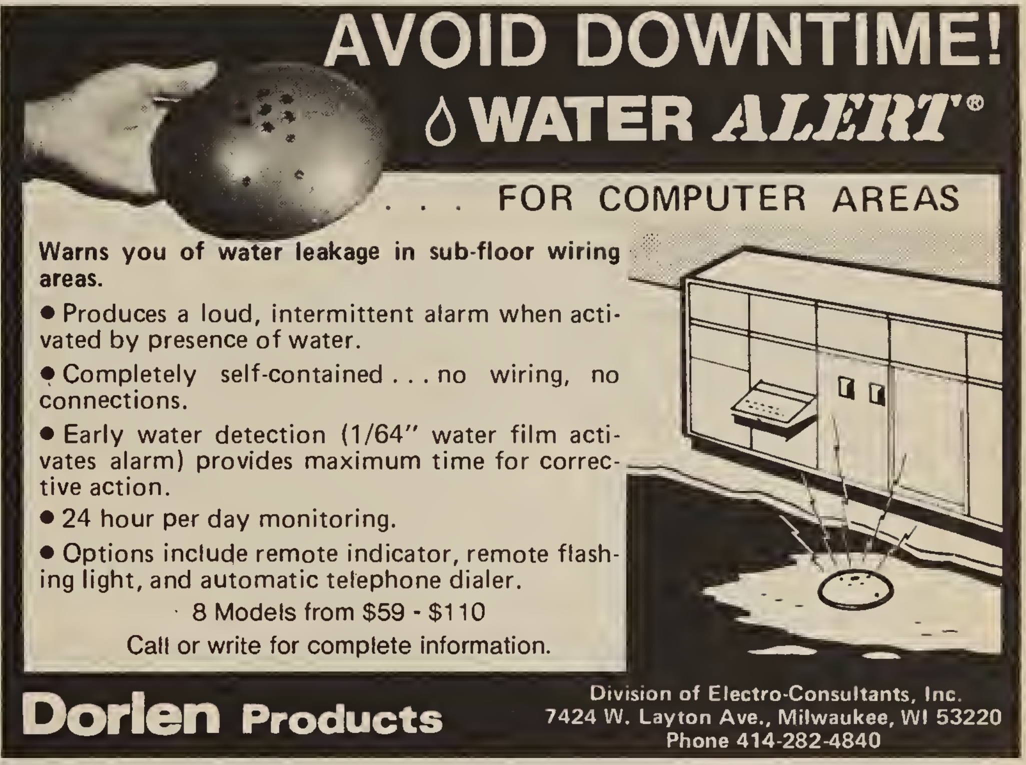
Thomas A. Grogan, director of acquisitions and development at McGraw-Hill, Inc., has been elected chairman of the Information Industry Association.

— — —

Joseph A. Verderber has been named AM International's Inventor of the Year, the first employee to receive that honor. The award was established under the company's Inventor's Incentive Awards Program, which recognizes employees whose work results in patents for the company.

— — —

Data Card Corp. has acquired the worldwide manufacturing, marketing and patent rights to the products and technology of Comparator Systems Corp. for one year, under the terms of a recently signed agreement. Data Card also has the option of permanent acquisition of those rights at any time during the year.


AVOID DOWNTIME!
WATER ALERT®
. . . FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained . . . no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

8 Models from $59 - $110
Call or write for complete information.

Dorlen Products
Division of Electro-Consultants, Inc.
7424 W. Layton Ave., Milwaukee, WI 53220
Phone 414-282-4840

END YOUR YEAR
-WITH A NEW BEGINNING-

MFGR./MODEL			PURCHASE PRICE	12 MO. LEASE*
QUME	5/45 RO	LETTER QUALITY	2550	119
	5/45 KSR	LETTER QUALITY	2875	128
	5/55 RO	LETTER QUALITY	2695	123
	5/55 KSR	LETTER QUALITY	3050	130
	WIDE TRACK	LETTER QUALITY	3695	165
NEC	55 CPS RO	LETTER QUALITY	3055	130
	55 CPS KSR	LETTER QUALITY	3375	135
DEC	LA 34 AA	WIOE CAR.	1195	72
	LA 120	1200 BAUO	2495	119
TI	820 RO PKG.	1200 BAUD	2025	92
	820 KSR PKG.	1200 BAUO	2250	102
	765	MEM. PORT	2595	123
	745 STD.	PORTABLE	1525	75
	745 U/L	PORTABLE	1595	84
	745 APL	PORTABLE	1675	89
LSI	ADM 3A	U/L DUMB. TERM.	850	49
	ADM 31	2 PG. MAX.	1325	72
	AOM 42	EXPANDS 8.PG.	2075	109
AJ	1234	ACOUSTIC 1200 BAUD	795	38
GDC	212A	300/1200 BELL COMP.	725	35

*INCLUDES ON SITE SERVICE IN 2M SERVICE AREAS
OFFER EXPIRES DECEMBER 31, 1980

2M CORPORATION
20 MONTESANO ROAD
FAIRFIELD, N.J. 070C6
TOLL FREE 800-526-2288
IN N.J. 201-227-7788

2M SUPPLY DIV. 800-526-2288 (201) 227-7789
• ACCESSORIES • ACOUSTIC COVERS • CABLES • PAPER • RIBBONS
• PRINT WHEELS • DISKETTES • MAGNETIC TAPES • ANTI STATIC MATS

2M SERVICE DIV. 800-526-2222 (201) 227-8855
• WARRANTY • ON-SITE • RESIDENTIAL • DEPOT • PER CALL
• CONTRACT • PREVENTIVE • RECONDITIONING • DEPOT PCB REPAIRS
• CUSTOM INTERFACING, DESIGN, MANUFACTURING

Orders & Installations

Qantas, Australia's international airline, has recently placed an order with Univac for the Univac Standard Airline System (USAS*CGO) to automate its cargo operations. New orders at Univac also include one from Penn Machine Co. for the System 80 processor to aid in manufacturing control; Ganes Chemical Co., Inc. purchased the same system for its billing, inventory control and general accounting; and Stones Southern School Supply of Raleigh, S.C., ordered the System 80 to fulfill the same functions.

Hasbro Industries, Inc. has chosen a Univac 90/40 system and a 90/30 processor for its manufacturing control in Pawtucket, R.I., and the U.S. Air Force Academy in Colorado Springs, Colo., has ordered $2.3 million worth of Univac system equipment to keep the medical records of the cadets in order.

Kranzley & Co., Inc., a subsidiary of Anacomp, Inc., will install its EFT 8500 transaction switching and processing system in Metroteller Systems, Inc. headquarters to meet the needs of Metroteller's 26 bank members throughout New York state.

Cray Research, Inc. announced that Westinghouse Electric Corp. has ordered a one-million-word Cray-1 S-series computer system, valued at approximately $8.1 million.

Oklahoma City has ordered the Informap System for interactive mapping and geographic data base management from Synercom Technology, Inc.

Valtec Corp. Communication Fiberoptics, has delivered a VS-100 fiber-optic baseband video system and 1.2 km of duplex fiber-optic cable to Cox Cable Communications, Inc. of Atlanta. Cox will utilize this system in evaluating light wave technology for future applications in CATV trunking, local distribution and short-haul signaling.

Satellite Business Systems will provide satellite-transmitted voice and data communications among earth stations for Wells Fargo & Co.

A $3.5 million order for in-plant-assembly computer systems made by General Automation, Inc. has been placed by an unidentified major Detroit-based automobile manufacturer.

Carl Byoir & Associates, a public relations firm, has placed an order with one of its oldest clients, Honeywell, Inc., for a Level 62 business computer. The two companies have been associated for 38 years.

Management Assistance, Inc.'s international unit has secured a $3 million order from Citibank N.A. for its Basic Four Corp. computers and related software to be installed in Citibank's Latin American operations.

The People's Republic of China will be receiving its recently ordered used IBM 370/138J from Cometals, Inc.

Northern Telecom Ltd. has installed two SL-1 digital business communications sytems valued at more than $900,000 at the New York Futures Exchange and The Depository Trust Co., two wholly owned subsidiaries of the New York Stock Exchange.

Gerrity Building Centers, a wholesale/retail lumber distributor with headquarters in Meredith, N.H., has placed an order with Univac for a System 80, and Eighty Four Lumber Co. of Pittsburgh, Pa., has ordered a $1.1 million Univac 1100/60.

Pan American World Airways, which recently acquired National Airlines, is installing new voice switching systems from the Collins Communication Switching Systems Division of Rockwell International Corp. in two of National's locations. The Automatic Call Distribution (ACD) systems are valued at $2.8 million.

The Grand Union Co. has purchased 1,000 MSI/88e portable data entry terminals from the MSI Data Corp., and Max Factor has ordered 283 MSI/88 portable terminals from the same firm to automate its order entry operations.

Computer Sciences Corp. has recently installed 44 four-color graphics display systems to enable the Navy to monitor operations during war-game exercises. The systems are manufactured by Sanders Associates, under the terms of a $1.8 million contract with Computer Sciences Corp.

Executive Corner

- The appointments of Robert F. Zenisek to vice-president of operations and John W. Crane-Baker to vice-president-treasurer were announced recently by GTE Lenkurt, Inc.
- F.L. Mike Harvey has been elected president and chief executive officer at the Verbex Corp., formerly Dialog Systems, Inc.
- Robert Turmala has been promoted to vice-president of sales in the western region of Data Access Systems, Inc.
- John V. Roach has been elected president and chief operating officer of Tandy Corp.
- Nicholas Scharf has been named vice-president of finance at Personal Software, Inc.
- In an internal reorganization at Software AG North America, Inc., Gary Bowers was named vice-president of education and consulting; Larry Jones was appointed vice-president of development; Steve Greaves was named head of the new Computer Services Division; and John Weil was promoted to vice-president of the western sales region.
- Jules M. Seshens has been appointed vice-president of 4-1-1 Systems, a division of Comshare, Inc.
- J.C. Chu, formerly of Honeywell, Inc. and Wang Laboratories, Inc. has been elected a director and chief executive officer of R.C. Sanders Technology Systems, replacing R.C. Sanders in that office.

Expansions

IBM recently dedicated its new 1.7-million-sq-ft manufacturing and development plant in Tuscon, Ariz., where it estimates it will employ up to 5,000 people within the next two years.

Computer & Communications Technology Corp. has made plans to establish a manufacturing facility in Moca, Puerto Rico, under industrial development incentive programs providing for favorable tax treatment. The firm has leased an initial 46,000 sq ft.

Codex Corp. has opened its newest facility, a 150,000-sq-ft office and assembly center in Mansfield, Mass.

Prime Computer, Inc. has entered into negotiations with the Springfield Area Development Corp. to purchase 90 acres of land west of Springfield, Mass., for future growth.

Machine Intelligence Corp. has moved its headquarters and manufacturing operations to 1120 San Antonio Road, Palo Alto, Calif.

Southern Systems, Inc. has announced the opening of it's new 10,000-sq-ft manufacturing plant for research and development operations at 2131 Sunnydale Blvd. in Clearwater, Fla.

Harris Corp. has broken ground for its largest expansion project ever. The $120 million investment in new buildings and equipment in the Palm Bay area of Florida will double the production capacity of the semiconductor manufacturer.

Congressional Information Service, Inc. has recently relocated to Suite 800, 4520 East-West Highway, Washington, D.C. 20014.

Computervision Corp. plans to acquire plant sites in Sanford and Gorham, Maine, in a move to expand its manufacturing operations in 1981.

Prime Computer, Inc. has opened its new world headquarters on the 35-acre site of the former Carling Brewery. The address is Prime Park, Natick, Mass. 01760.

Nickels & Dimes

Wang Laboratories, Inc. shareholders approved an increase in the number of authorized shares of Class B common stock from 30 million shares to 70 million shares.

$$$

IBM directors announced a regular quarterly cash dividend of 86 cents per share on the common stock payable Dec. 10 to shareholders of record Nov. 12.

$$$

The **General Datacomm Industries, Inc.** board voted a 3-for-2 stock split, payable Nov. 20 to shareholders of record Nov. 6.

$$$

MSI Data Corp. declared the regular cash dividend of 10 cents per share payable Dec. 17 to shareholders of record Nov. 14.

SYSTEMS DEVELOPMENT STANDARDS

A READY-TO-USE METHODOLOGY FOR SYSTEMS DEVELOPMENT & MAINTENANCE

CARA's Systems Development Standards, designed in the concept of "Keeping Standards Simple," detail WHAT tasks are to be performed, outline the responsibilities for WHO performs the tasks and provide a reference library on HOW techniques for producing the deliverables. These standards supply the communication link between data processor user and top management while providing the framework your organization may need to better manage the development and maintenance of systems applications.

CARA can provide this planning tool, a simple, yet comprehensive four-level project definition, control and documentation system designed to help you achieve the intended goals of your systems projects.

State-of-the-Art! Industry Proven!
Plan, Organize, Document, Control and Produce!

For Information Contact:

CARA CORPORATION
611 E. Butterfield Road / Suite 110
Lombard, IL 60148 / 312/968-8100

SOFTWARE PROFESSIONALS

Think bigger and bigger in maxi systems at NCR/SAN DIEGO

If you welcome the stimulation inherent in creating a new generation of medium and large-scale mainframe systems, consider NCR. Our Engineering & Manufacturing facility in San Diego offers you a chance to help develop the most ambitious systems ever undertaken by NCR.

You'll be part of a major design operation. And will work with top professionals who are showing the way in advanced systems architecture, virtual systems capabilities, multiprocessing, data base management, firmware emulation, and advanced circuit technology. In short, you'll be shaping total systems that meet the needs of the future in one or more of the following project areas:

- **Creating software for virtual systems**
- **Designing software packages to complement new OS architectures**
- **Developing and implementing VLSI technologies**
- **Improving memories and facilitating disc emulation for PASCAL and COBOL**
- **Increasing interactive speeds and multiprocessing capabilities**
- **Extending the state-of-the-art in distributed processing design**
- **Developing new performance evaluation and modeling procedures**
- **Linker/Loader development**
- **Text editor development**

Immediate opportunities are available for:

Performance Analysts—Consultant

You will use your related experience and expertise in computer methodologies to support the development of transaction, interactive, and distributed processing systems. Through the analysis of measurement and modeling you will guide efforts to produce high performing, highly competitive systems.

O/S Programmer/Analysts

Our Operating System Software Groups seek talented professionals to design future operating system software and new features in support of transaction processing/on-line systems. You should have a BSCS or equivalent, plus 2 years experience in large scale operating systems utilizing assembly language, and PASCAL or other block structured languages.

Programmer/Analysts

Support of NCR's large-scale virtual programs. Duties include isolation and correction of field reported problems, test design, specification updates, and implementation of approved changes. BSCS or equivalent required plus experience in assembly language and virtual memory O/S desirable.

Senior Systems Analyst

Design, develop and implement programs for diagnostic testing. Requires BSCS/BSEE or equivalent with minimum 5 years of experience and ability to make H/W-F/W-S/W design tradeoffs.

Programmer Analyst

Design and implement ROM resident self tests. Assist in H/W bring-up and review H/W schematics and logic flow. Requires a BSEE or equivalent with 3 years experience. Microprogramming and microprocessor experience desirable.

Programmer Analyst

You will develop diagnostic programs in support of peripheral subsystems. Requires BSCS/BSEE or equivalent with 2 years experience in I/O subsystems and controllers. Microprocessor experience a plus.

In addition to being strategically located in an accelerating $3 billion computer company, you'll be working in Rancho Bernardo—a community of 14,000 in the most beautiful part of Southern California. Nearby San Diego and surroundings offer a broad spectrum of maritime resources, housing options and prices, and living environments. Our top benefits include relocation assistance.

Send your resume to: Mr. Hal Ostrander, Personnel Resources, Engineering and Manufacturing, Dept. T50, NCR Corporation, 16550 W. Bernardo Drive, San Diego, CA 92127

NCR
Complete Computer Systems

An Equal Opportunity Employer

SOFTWARE BUSINESS PROFESSIONALS.

From unmanned space probes to energy management applications to message switching systems to magical Florida lifestyles. MODCOMP makes it happen.

MODCOMP is offering you the special involvement, recognition and challenge that comes with working on a variety of industry-leading projects.

And the special magic of South Florida. A unique blend of city lights and sunshine, palm-lined boulevards and beaches.

Let it happen for you.

Right now, we are looking for individuals to fill the following positions:

SOFTWARE BUSINESS PLANNING MANAGER

New position created to establish and direct the fast growth area in mini-computer software operating systems, compilers, and application packages. MODCOMP seeks an experienced individual to establish pricing, licensing, and support policies, to do competitive analysis, and in general, help define the direction MODCOMP's extensive software capabilities will take.

This is a high visibility position which affords the individual selected the ability to have significant impact on the course of the company's future.

SOFTWARE PRODUCT PLANNER

New position to define and generate software product requirements, provide technical consulting, and track technical contents through the development cycle.

Successful candidates must possess mini-computer software knowledge. MODCOMP software background a plus. Should be able to interface with users at all levels. Visibility and growth potential excellent. Some international travel.

MODCOMP provides excellent salaries and benefits, including medical/dental insurance, an employee stock purchase plan and liberal relocation assistance.

Please send resume with salary history to: **Rob Storch, Professional Staffing, Modular Computer Systems, Inc., P.O. Box 6099CW, Fort Lauderdale, Florida 33310.**

MODCOMP

CREATING SUPERIOR TECHNOLOGY. BY DESIGN.

An Equal Opportunity Employer M/F

MODCOMP MAKES IT HAPPEN.

EDP Specialists

Sunbelt $20,000-$55,000

Career Search Opportunities

D. P. MANAGER TO $40,000.

Division of billion dollar corporation located in attractive Southern metro area needs manager for IBM mainframe shop. Prefer on-line background with good supervisory experience. Reports to Corporate MIS Director. Immediate need.

PROJECT MANAGER TO $34,900.

Tennessee based NYSE listed corporation needs P/M to head up point of sale terminal development. Prefer good management ability in POS or minicomputer environment. Front office hotel/motel systems a plus. Reports to D.P. Director.

ASST. DIRECTOR OF MIS TO $28,500.

Major division of Fortune 500 manufacturer needs operations oriented manager to coordinate short and long term financial & manufacturing projects. Exceptional candidate will have IBM/DOS/CICS/COBOL mainframe experience. Small shop in attractive Southern rural town.

SR. PROGRAMMER TO $28,200.

Large Mid-South manufacturer needs lead programmer for new systems development. Prefer IBM, COBOL, CICS, with leadership ability. Career advancement opportunity to Systems Analyst on planned career course.

SR. PROGRAMMER ANALYST, $26,800 RANGE.

Major Southeastern Fortune 500 corporation needs Sr. P/A for new D.P. division. Prefer IBM/DS mainframe experience in COBOL, ISM software environment. Reports to Systems Manager. Excellent benefits and relocation package.

PROGRAMMER/ANALYSTS (2) TO $25,500.

Mid-South industrial leader desires (2) P/A's to design and implement manufacturing programs. Need 3-5 years experience in Amdahl or IBM mainframe shop. Should possess strong COBOL knowledge, with IMS and/or CICS a definite plus. Excellent benefits and relocation package.

SYSTEMS ANALYST, $24,000 RANGE.

Warm weather enthusiast will love this relaxed Florida location. 1-4 years financial systems experience in COBOL, DMS, CICS or DLI is most desirable. Good technical and communications skills a must. Outstanding, unusual benefits package.

All Fees Assumed By Client Companies

Contact Don Clement or Jim Morgan • *(901) 761-4560*

Executive Personnel Consultants
A General Services Company
606 South Mendenhall at Poplar
Memphis, TN 38117

LAS VEGAS NEVADA

PROGRAMMER/ANALYSTS

Immediate openings exist for Programmer/Analysts to support maintenance and/or development of complex business information systems. To qualify for one of these career-building opportunities, candidates should possess any combination of training and experience equivalent to a Bachelor's Degree in Business or Computer Science related field, plus two or more years of experience in Cobol and/or Fortran on large timesharing systems. The hardware environment consists of a CDC 6400 being enhanced in January with a Cyber 74 to meet the growing needs of a mature data processing installation. We offer an excellent benefits package that includes relocation expenses, educational assistance, savings, retirement, life, dental and medical insurance.

For over 25 years Reynolds Electrical & Engineering Co., Inc. has provided a multitude of diverse services to the Department of Energy.

Las Vegas, Nevada, is the hub of western outdoor life. Within minutes of Las Vegas you can be enjoying activities such as waterskiing, sightseeing, snowskiing and fishing. Approximately 314 days of sunshine a year await you in a clean air environment.

If you are looking for challenging work in a great climate, contact Ms. Trudie Rainey at 1 (702) 734-3291 (Call Collect) or

Send your resume to:
Reynolds Electrical & Engineering Co., Inc.
Employment Section, Mail Stop 567
Post Office Box 14400
Las Vegas, NV 89114

Reynolds Electrical & Engineering Co., Inc.

EDP Systems Training Sr. Instructor Specialist

(Phoenix Area)

Fireman's Fund Insurance Companies, one of the most prestigious companies in the industry has an excellent opportunity for a professional to conduct training courses in IMS, in our Phoenix office.

We're looking for a talented individual who is able to understand radically new technical concepts quickly and translate that knowledge into state-of-the-art training.

To qualify, you must have 5-7 years' data processing experience including extensive IMS/data base experience.

Qualified candidates should submit resumes to Jackie Schwarz, Fireman's Fund Insurance Companies, 1600 Los Gamos Drive, San Rafael, CA 949111. Or call collect, (415) 492-6096. An equal opportunity employer.

YOUR FUTURE IS AT FIREMAN'S FUND.

CALIFORNIA

If you are interested in relocating to CALIFORNIA, call the West Coast's largest firm devoted exclusively to employment services for the Computer Professional. Our staff is composed of former DP Managers and Software Specialists, well-equipped to understand your special needs.

You may call us collect.

COMPUTER CAREERS
INC AGENCY

3303 Harbor Blvd.
Suite C-10
Costa Mesa, CA
92626
(714) 979-7687

UNIVERSITY OF VERMONT SYSTEMS ANALYST

The Office of Management Information and Computing is seeking a Systems Analyst with a BA or equivalent in a math or business related field. Applicants must have at least 5 years of data processing experience, three as a systems analyst. Experience in COBOL and IBM/DOS are required. Applicants with experience in higher education application, on-line systems and DBMS are preferred. The candidate hired will be involved in the development of applications under our integrated database. We offer an excellent benefits package. Salary, low to mid twenties, commensurate with qualifications. **Send resume and 3 professional references no later than Dec. 12, 1980 to University of Vermont, OMIC, 238 Waterman Building, Burlington, Vermont 05405.**

An Affirmative Action Employer

Some computer companies seem to keep software groups isolated – even pit them against one another.

At Wang, we cooperate.

No matter which group you're in, no matter what project you're working on, we always encourage interaction. Because that's how great ideas happen.

We also offer high career visibility and plenty of personal freedom, plus day-to-day advantages like unlimited computer time, your own terminal, generous work space, and more.

All because we realize that to have the best software in the industry, we need the best software developers. And the happiest.

For more information, contact Susan Morse Wang Laboratories, Inc., Dept.#121 One Industrial Avenue, Lowell, MA 01851.

At Wang, no software group is an island.

WANG

Making the world more productive.

©1980 Wang Laboratories, Inc., Lowell, MA 01851. We are an affirmative action employer.

Systems Software Development.

VS DATA BASE DEVELOPMENT

At Wang, we see data base concepts as keys to solving a much broader set of problems than mere data retrieval and presentation. Some problem areas where data base technology are applicable include distributed processing, data base machines, transaction-based systems, networking, display and Forms management, as well as integration of data processing and "office-of-the-future" product directions. Concomitant with these directions, we are committed to helping solve the software engineering problems that currently attend the use of large shared data bases through the development of very high level language interfaces for the application programmer, non-programmer, and data base designer.

At Wang, we are building state-of-the-art dictionaries, hybrid file systems, query and data definition languages, not as an end in themselves, but as tools to help the end user solve his problems. Some of our products like ADMS, and advanced data management system with centralized data descriptions and a sophisticated recovery/restart system, have already been announced and are well on their way toward becoming products. Others like VS-DBMS, a model independent Data Base which supports both relational and navigational interfaces, are currently under design. Still others such as Query Languages, Data Base Design tools, and a Forms Management System are in the planning stages.

INTERMETRICS
THE LEADER IN COMPILER TECHNOLOGY

INTERMETRICS, INC. is recognized internationally for advancing state-of-the-art in the design and implementation of multi-targeted, highly optimizing compilers integrated into complete software development systems. In addition, we are committed to the continued development of sophisticated tools as the keystone of powerful and supportive programming environment. Intermetrics is seeking outstanding individuals to perform highly visible key positions in our Cambridge, MA and Washington, D.C. divisions.

COMPILER PROJECT MANAGERS

To direct the design and implementation of integrated compiler systems for a variety of host and target machines in such languages as Ada, Pascal, JOVIAL and FORTRAN.

PROGRAMMING METHODOLOGY SPECIALISTS

To develop techniques for specification, design, testing and configuration management and to build software engineering tools supporting those techniques.

SUPPORT SOFTWARE SPECIALISTS

To specify, design and implement editors, debuggers, linkers, loaders, and static analyzers in the development of user-friendly systems.

INTERMETRICS, INC. is an established and growing scientific engineering firm involved in a wide spectrum of software development activities. We offer an informal yet results-oriented environment, flexible working hours, competitive salaries, and outstanding benefits including such features as three weeks paid vacation, group medical and dental insurance, and profit sharing.

If you're planning to attend the SIGPLAN Symposium on the Ada programming language in Boston in December, we would be glad to arrange a day or evening meeting to discuss opportunities at Intermetrics.

If interested, call collect at: (617) 661-1840 any weekday 9 AM - 5:30 PM or write to:

Personnel Department
INTERMETRICS INC.
733 Concord Ave.
Cambridge, MA 02138

An Equal Opportunity Employer M/F/H

INTERMETRICS

Engineering Graphics

Structural Dynamics Research Corporation has several immediate openings for people to develop Interactive Graphics applications software. This software represents state-of-the-art code and will have a major impact on mechanical design processes. We offer an exciting working environment to support this software development activity:

- We have 2 VAX 11/780's and a host of DEC 11's; terminals include storage, color raster and vector displays.
- Each of our software development engineers has a terminal in his/her own office.
- The major client projects which we are presently working on are all in growth industries and all represent long-term commitments by these companies.

What we are now looking for are people who have the ability to develop this engineering graphics software. If you have this experience and ability, and are seeking a professional challenge we would like to hear from you.

Software Development Engineers

Applicants should have a degree in computer science or engineering and have 1-5 years experience in the following areas:

- Computer Graphics.
- FORTRAN programming in a timesharing or minicomputer environment.
- Automated drafting experience a definite plus.

Software Management

These are high-level assignments calling for 8 years or more experience and preferably an advanced degree. You should have:

- Software development experience at the systems level.
- The ability to define and direct programming tasks.
- The experience and ability to propose and evaluate alternative hardware/terminal/software configurations.

SDRC

has grown at a compound rate of 35% per year and now has over 330 professionals in its new corporate center in Cincinnati, with branches in San Diego, Detroit, London, Paris, and Wiesbaden. We are located in suburban Cincinnati offering a convenient mix of urban, suburban, and rural life sytles. The cost of living index for Cincinnati is one of the lowest for a major metropolitan area. Employee benefits including tuition refund, medical and dental are excellent and are all company paid.

We would like you to send us a resume — or better yet
CALL COLLECT:

Howard Polster
Structural Dynamics Research Corporation
2000 Eastman Drive
Milford, Ohio 45150
(Daytime) 513/576-2607
(Evening) 513/793-7779

An Equal Opportunity Employer M/F

CONNECTICUT Is A Great Place To Live & Work!!

If you're looking for affordable housing in an area with no state income tax, consider the growth opportunities our clients have for:

- **Programmers**
- **Analysts**
- **Systems Programmers**
- **Project-Leaders**

Desire experience with any of the following disciplines:

- **COBOL or ASSEMBLER**
- **On-Line exp with CICS**
- **IMS**
- **3+ yrs. large-scale IBM**
- **Insurance or Financial Systems Design/Programming**

If you like a fast-paced, demanding, challenging atmosphere where your individual contributions will be recognized, why not contact us to explore your career goals & objectives. We are dedicated to being worthy of your trust & confidence.

compass, inc.
900 Asylum Ave.,
Hartford, Ct. 06105
(203) 549-4240

"We are an equal opportunity employer retained search & placement firm"

A Member of National Computer Associates Offices Nationally

DATA BASE ADMIN.

Nat'l. recognized electronics mfr. seeks take charge self-starter to manage DB/DC function. Hvy. sys. planning with fin'l., mfg. & sales apps. knowl. desired. Oppty. in executive climate. Salary $29,000.(Fee Paid). Contact Hank Phillips.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

COLORADO ROCKIES
DATA PROCESSING PROFESSIONALS

Headquartered on Colorado's beautiful Western Slope, rapidly growing utility company is seeking energetic self-starters for the following positions:

- SYSTEM & PROGRAMMING SUPERVISOR
- SYSTEM ENGINEER
- SYSTEM ANALYSTS
- PROGRAMMERS

Equipment is IBM 370/158 using MVS, CICS, DL-I, DMS.

Excellent benefits and opportunities. Send resume to Dept. JVJ, Colorado-Ute Electric Association, Inc., P. O. Box 1149, Montrose, Colorado 81401

An Equal Opportunity Employer M/F/H/V

Exeter Associates

NATIONAL RECRUITING CONSULTANTS

BRUCE A. MONTVILLE
MANAGING PARTNER
(603) 926-6712

DATA COMMUNICATIONS MANAGER
$38,000-$44,000

If you really want a challenge with unlimited resources for state of-the-art development, our international client has it all. Plan, lead and execute.

The Client:
This is the Corporate Telecommunications Center of a world-wide, multiple-product manufacturing company. Although business data processing is decentralized by divisions, all data communications are controlled and assisted at this location.

The Position:
Supported by multiple large scale mainframes, sophisticated communications systems and mini-clusters, you will have the unlimited opportunity to manage the continued development of our client's data communications capabilities. This job is open due to promotion.

Qualifications:
Have a track record of recognition as a contributor/leader in commercial data communications. Be up-to-date with the latest state-of-the-art. Be able to conceptualize and communicate well with your peers. Above all, be able to take responsibility, manage and plan technically.

For prompt and confidential consideration, forward your resume or call us collect.

(603) 926-6712
P.O. BOX 623, COMPUTER PARK, HAMPTON, N.H. 03842
A COMPONENT OF EXETER INTERNATIONAL, INC.

MVS SYSTEM HEAVIES

Tired of sysgens and boring work? Are you good enough to develop state-of-the-art performance software? Do you want to join the leading edge of IBM MVS SE/SP technology? If all this plus a top salaried, super environment interests you, reply in confidence to:

Director, Software Products Division
APPLIED DATA RESEARCH, INC.
Route 206 and Orchard Road, CN-8
Princeton, New Jersey 08540

An Equal Opportunity Employer m/f/h/v

ADR

AMERICAN GENERAL LIFE INSURANCE COMPANY

Computer Professionals

FIND GROWTH AND STABILITY WITH AMERICAN GENERAL IN HOUSTON

American General, a Fortune 500 diversified financial services group, offers a great opportunity for growth and stability for Data Processing Professionals in Houston, Texas. American General's planned expansion throughout the Data Processing staff has created openings for programming group supervisors, systems analysts, programmer analysts, programmers,and systems programmers who seek the secure economy, low cost of living and career potential that only Houston can provide.

To meet the challenge of our growth, candidates should possess experience with large IBM main frames. COBOL or ALC experience is also required.

American General's computer environment includes IBM 168 and 3033 hardware operating with MVS, TSO and IMS DB/DC. All new systems including several now being planned will be developed with IMS DB/DC. By joining American General now, you may have the opportunity to participate in the development of these modern systems.

American General offers competitive salaries and comprehensive benefits, including a generous relocation package. Find growth and stability with American General in Houston.

For more information call:

1-800-821-7700 Ext. 618
1-800-892-7655 Ext. 618 (Missouri residents only)

or send resume to:

AMERICAN GENERAL LIFE INSURANCE COMPANY
c/o Therese Ryan
P.O. Box 1931
Houston, Texas 77001

American General, a better place to work.

An Equal Opportunity Employer

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C.
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

COMPUTER PROGRAMMER

Opening in our Radiology Department for Computer Programmer with a minimum of 2 years programmer experience with some DEC computer experience with PDP 11/70, RSTS/E operating system BASIC-PLUS data base. We offer an excellent salary and benefits package. For immediate consideration phone (215) 662-3175 weekdays.

HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA
3400 Spruce Street
Philadelphia, Pa. 19104

An Equal Opportunity Employer, M/F/H

Our Most Important Innovation For the Future Is You

If you're ready to make an important move in your career development, step into the future now with Software AG.

Software AG is well-established throughout the data processing community as an aggressive leader in state-of-the-art software innovation and technology.

- ADABAS, our award-winning DBMS, has been high on the prestigious Datapro Honor Roll for three consecutive years.
- NATURAL, our unique instant online applications language, revolutionizes applications program development.
- COM-PLETE, our TP system, combines interactive program development and systems management in one package.
- We've recently developed the first practical Data Base Machine in the DP industry.

Software AG insists on the highest possible standards of excellence in the people who comprise our professional staff. Because we know that our continued success in this constantly evolving market literally depends on how good you are.

If we sound like the kind of company that can provide you with the innovative, professional growth you've been looking for, place yourself in one of the major career categories below, and send us your resume today.

General requirements: To qualify for any Software AG position, you should have 3 to 5 years DP experience with IBM 360, 370, and 4300 systems. DBMS background is essential (ADABAS preferred), and DB/DC experience is also helpful.

Sales Proven success in software sales to users of medium to large IBM or IBM compatible equipment a must.

Sales Support Ability to assist in the software selling process — including benchmark testing and product demonstration — required.

Education/Consulting Superior communications skills a must. Applications programming and/or systems analysis background preferred.

Systems Programming TP experience required; MVS and VTAM familiarity a plus.

Research & Development Experience in the development and enhancement of data base and teleprocessing systems is necessary. Assembler experience essential.

Technical Field Support Background in telephone and on-site support, plus product installation experience.

Send resumes to:
Software AG of North America Inc.
Personnel Office
Reston International Center
11800 Sunrise Valley Drive
Reston, Va. 22091

SOFTWARE AG
OF NORTH AMERICA, INC

Software AG is an equal opportunity employer. All resumes are strictly confidential.

SYSTEMS SOFTWARE
TECHNICAL SUPPORT MANAGER

We will be installing a new large scale MVS system controlling a nationwide RJE/TSO network. Here is a real opportunity for a person with appropriate experience and knowledge to get involved at the beginning.

We seek an individual to create, build and manage a Systems Programming/Technical Support Department with responsibility for analyzing and evaluating software alternatives and then installing and supporting.

IF YOU...

- Want challenge with start-up responsibility for designing software interface;
- Are a systems programming manager or assistant systems programming manager in a MVS shop;
- Want a position with a solid and growing billion dollar people oriented company engaged in products with a future: management, conservation, control and storage of energy;

... WE WOULD LIKE TO TALK WITH YOU.

Send resume in strict confidence to **MR. EDWARD BOELK, Executive Offices, JOHNSON CONTROLS, INC., 5757 N. Green Bay Avenue, Milwaukee, WI 53201.**

(414) 228-2344

JOHNSON CONTROLS®

An Equal Opportunity Employer

DECSYSTEM•
20 SYSTEMS PROGRAMMERS

Join the vanguard. American Management Systems, one of the nation's fastest growing computer service companies, pulls out the stops in career growth.

We've carved out a significant segment of the computer services market by providing complete applications and outstanding technical support.

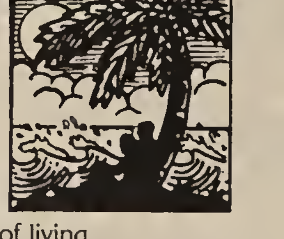
We need self-starting, problem-solving Systems Programmers to maintain and upgrade language and language software products (compilers and editors). You'll perform system enhancement projects of 3 days to 3 months duration and troubleshoot operational systems problems. You will also be an essential member of our support systems team, providing off-hours telephone support to our clients. Requirements: 2+ years DECSYSTEM 20 or 4+ years DECSYSTEM 10 experience or CS degree; knowledge of TOPS 20 or 10, 10/20 MACRO; RSX 11M, D, or S, any DECSYSTEM 10/20 editor, language or language products desirable.

We want you if you are the best and we'll pay for it with strongly competitive salaries and an excellent benefits package. A challenging and congenial atmosphere will give you the best opportunity possible for career advancement. Send your resume and salary history to: Leah Harcourt, AMS Computer Center, 1901 North Moore Street, 12th Floor, Arlington, VA 22209. An Equal Opportunity Employer.

Pull the Stops Out From Your Career

ams

Free Weekend in the BAHAMAS



A luxury weekend for two at Disneyworld or a Bahama resort (your choice) including food and transportation is waiting for you, if you accept employment as a result of this ad.

Opportunities for computer professionals in Florida have been increasing at an explosive rate. Salaries are higher than ever, allowing for your total enjoyment of the Florida style of living.

Our client companies from Jacksonville to Miami have requirements from entry level through MIS directors, and all positions are fee paid.

Through our membership in National Computer Associates, boasting of 27 affiliates, we can also assist you in exploring other opportunities throughout the country.

Please send your resume promptly to Data Sciences Personnel, Inc., P.O. Box 8577, Hollywood, Florida 33024. For further information, call collect: Helen Ina/305-434-6112.

DATA SCIENCES PERSONNEL, INC.
A MEMBER OF NATIONAL COMPUTER ASSOCIATES

SAN DIEGO
and West Coast

Major firms retain us to find professional Data Processing personnel. Many positions available: System/Programmers, Programmers, System Analysts, Pre & Post Sales. All replies confidential.

Call or send resume to:

FO-R-T-U-N-E
PERSONNEL AGENCY OF SAN DIEGO, INC

8334 Clairemont Mesa Blvd., Suite 211
San Diego, CA 92111

(714) 571-8551

ROBERT HALF

SOUTHERN OPPORTUNITES

DP MGR MUST RPG II PROG	$30K
P/A BASIC OR FORTRAN	$25K
P/A 1YR RPG II	$18K
PROG DATABUS	$19K
P/A COBOL MFG MRP	$24K
PROG COBOL CICS	$28K
SYS/ANALYST FORTRAN	$21K
PROG COBOL 2 YRS	$20K
P/A PL1 BUSINESS APPL	$25K

Fee Pd—Relo Paid—No Contract
ROBERT HALF
of LOUISIANA
135 St. Charles Ave., Suite 1020
New Orleans, LA 70130
(504) 524-3773

Tomorrow-minded
EDP Professionals

Martin Marietta Aerospace NASA's Contractor on the Space Shuttle External Tank Program has immediate openings for the following:

SYSTEMS ANALYST
Experience with data base systems in identifying and solving business problems in a manufacturing environment.

BUSINESS APPLICATIONS PROGRAMMERS
Minimum 2 years experience in developing and coding COBOL data base (UNIVAC).

PROCESS CONTROL
Minimum 2 years experience in FORTRAN utilizing HP-1000 processing systems for process control applications.

SCIENTIFIC APPLICATIONS PROGRAMMERS
Experience in FORTRAN or PASCAL, familiar with structural and thermal modeling, space flight data reduction and analysis and Integrated Aerospace Vehicle Design.

We offer competitive starting salaries and fully paid company benefits. These opportunities exist at our Michoud Assembly Facility located in Suburban East New Orleans. Qualified candidates interested in learning more about these opportunities at Martin Marietta...the tomorrow-minded aerospace people, should forward resume including salary history to: Ms. Dottie McCann, Martin Marietta Aerospace, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

EDP/MIS Professionals New England/East Coast/ Nationwide

Robert Kleven and Co., Inc. has a wide variety of positions available in programming, Systems Analysis/Design, Data Base Applications, Applications Programming and Software Support for professionals well versed in the field. If your experience covers one or more of the following areas, contact us: Technical Support; COBOL/IMS/CICS/ DOS/OS/VS/ VM/MVS Programming/Design; Assembly or Higher Level Language Programming; Data Base Design/Utilization; Technical Writing.

We've been providing Confidential and Industry-Knowledgeable placement for MIS professionals since 1969. We can also provide you with free resume preparation and career path counseling. Client companies assume all fees. Contact: Simone Zani

Robert Kleven and Co., Inc.
INDUSTRIAL RELATIONS MANAGEMENT CONSULTANTS

Three Fletcher Avenue, Lexington, Massachusetts 02173
Telephone (617) 861-1020

Member
Massachusetts Professional Placement Consultants
National Computer Associates
(Offices Nationwide)
Representing Equal Opportunity Employers M F

EDP PROFESSIONALS

SOFTWARE ENGINEERS, SYSTEMS ANALYSTS, PROGRAMMERS, $16K-$50K. We specialize in New England high technology and business opportunities, plus nationwide listings. Send resume, in confidence, w/salary history to: Fred Raisner, SEARCH, INC., 144 Westminster St., Providence, RI 02903 (401/272-2250).

PROGRAMMERS/SYSTEMS ANALYSTS, $18,000-$45,000. Have a great winter in New England! Send resume or call Dick collect at oldest employment service in Central NE (estab. 1946). LANE EMPLOYMENT, 405 Main St., Worcester, MA 01608 (617/757-5678).

DATA PROCESSING CANDIDATES, $19,000-$40,000. Outstanding nationwide opportunities, entry-level thru management, in all data processing disciplines including scientfic designers of mini-computers and microprocessors and Programmers with business & financial applications exp. For immediate reply, contact P. L. Davis at PROFESSIONAL RECRUITERS, INC., 7777 Bonhomme, Suite 1903, St. Louis, MO 63105 (314/727-7806).

EDP MANAGEMENT/SYSTEMS ANALYSTS/PROGRAMMERS, $18K-$40K+. Choice upstate NY & U.S. openings. Entry level thru top corporate positions. EDP placement specialists. In confidence send resume or call James F. Corby, Pres., NORMILE PERSONNEL, 5 Leroy St., Box 110 Westview Station, Binghamton, NY 13905 (607/723-5377).

SOFTWARE ENGINEERS/EDP MGMT/SYSTEMS ANALYSTS/PROGRAMMERS, $17,500-$57,800. Mpls, Midwest & National Listings. Send resume to EDP Specialist, J. R. Shoemaker, ABC EMPLOYMENT SERVICE, 401 2nd Ave. S., Minneapolis, MN 55401 (612/339-1453) (Collect) (Highest Quality of Life Anywhere).

PROGR'S, PROG./AN., SOFTWARE PEOPLE, $18K-$38K. Opportunities for career growth in your geographic choice North, South, East or West. For realistic evaluation of your marketability call me collect or send resume to RUSTY THAYER, ARTHUR PERSONNEL, 8 Forest Ave., Suite D4, Caldwell, NJ 07006 (201/226-4555).

SYSTEMS ANALYSTS, PROGRAMMERS, EDP AUDITORS. Wide ranges of experience. Entry through management. Bay Area, California, National. Send resume to Brian Auten, ACCRO PERSONNEL AGENCY, 1330 Broadway, #941, Oakland, CA 94612 (415/839-2080).

npc *the nation's foremost intercity placement network since 1933*
NATIONAL PERSONNEL CONSULTANTS

Computer Executives Forecast For 1981

Can this market get any better in 1981? You can bet on it. As you can see below, there is quite a BACKLOG of openings STILL LEFT from 1980. December is a time to reflect upon the past year of your career. If a job change is in the cards — Act Now — Get the Jump on those PROCRASTINATORS who will hit the street en masse in January.

Current Searches

Director of MIS New Mainframe, New Building, New You!!	To $65,000
Director Manufacturing Systems Process Experience Helpful	To $60,000
Worldwide Systems Planning Manager Design & Implement Corp Systems Architecture	To $60,000
Internal MIS Consultant Develop Master Algorithm for Mfg. Systems	To $60,000
Director of MIS Relocate to Florida	To $55,000
Telecommunications Manager Sun Belt Location — Both Voice & Data	To $45,000
Project Managers — Banking Applications Numerous Openings Available Now	To $42,000
Manager of Systems & Programming L.A. Location — IBM OS Experience	To $40,000
Project Leader — Manufacturing Software Developer with HP 3000 Know How	To $40,000
Operations Manager — Major IBM Shop STATE-OF-THE-ART 303x & 4300	To $40,000
Sr. Database Analyst Be A Guru To Major Applications Group	To $40,000
Manager of Manufacturing Systems Run Interference Between D.P. & Users	To $38,000
Technical Manager — Mini's Select & Install New Hardware/Software	To $35,000
Programmer Trainer Applications Person Who Wants to Teach	To $32,000
Project Managers — Good At Training Anyone for Panama? Extra Benefits	To $32,000

State-Of-The-Art
Search and Placement

(415) 421-1142

Thomas Beck Inc.

Suite 3033
595 Market Street
San Francisco, California 94105

Executive Search for the DP Industry
Client Companies Assume All Fees

Senior Analyst Programmer

A leading San Francisco Bay Area firm has an opportunity to work with their management information systems. This position is responsible for providing multiple levels of management with product performance and profitability information.

The successful candidate will provide technical leadership, including identifying and scheduling, both business and technical enhancements to the system. You will also direct and train other team members.

Requirements include COBOL and PL/1 skills, plus some ASSEMBLER knowledge under 3033 or 370, MVS, including IMS, DB/DC. Familiarity with VSAM and TSO is preferred. You should also have a background with proven leadership and project control experience.

Salary is $32K plus excellent benefits. Call COLLECT, or send your resume today. Naturally, the fees are paid by the employer.

LOGICAL OPTIONS, INC.

One Market Plaza, Spear Tower
Suite #2014 C
San Francisco, CA 94105
(415) 777-3900

Account & Product Managers

Challenging Careers in Software Consulting for Higher Education.

Established in 1968, Systems & Computer Technology Corporation (SCT) has become the leader in the field of higher education computer center management and consulting. Ours is the only organization of its kind specializing in this area. We are recognized as the national authority.

SCT's growth provides outstanding opportunities for dynamic managers seeking career progress. We need each other to GROW.

Our capabilities range from complete computing resource management and technical support services to the development of software applications, and management of multi-center user locations with on-line data base software.

Account Managers

Take on P/L accountability while managing your own business area. This position allows you to combine your entrepreneurial spirit and professional expertise while you assume total responsibility for the delivery and installation of administrative systems software at computer centers, and assure complete account satisfaction.

To qualify, you must have had prior responsibility for budgets in the systems development area, senior-level client/user relations, and possess excellent communications skills. We require an individual capable of taking independent business action.

Product Managers

Your challenge will focus on the management of a product line that includes the design, development and implementation of on-line data base student and/or financial information systems, such as: funds and encumbrance accounting, student admissions, registration and records, and payroll/personnel and position control. This will include significant user contact, planning, directing and evaluations of administrative systems development, design and enhancement.

We are looking for a strong motivator with exceptional communications, planning and project analysis skills. You should have at least 5 years administrative systems work including a minimum of 3 years data processing management. You must also be able to function in both technical and functional subject matter areas as required. Our Product Managers assume P/L responsibility for a product line.

Rewards are equal to your skills and experience, and include: highly competitive salary, equity interest through stock pariticipation, complete relocation assistance, and a full benefits package.

If you want to practice your skills in the private sector, enjoy some travel, and be involved with multiple software applications and hardware vendors, accept our challenge by calling...

Mr. Dave Volz COLLECT
Monday through Friday, 9AM to 5PM,
(215) 647-5930

If unable to call, please submit your resume in strict confidence to: Mr. Dave Volz, Manager, Corporate Recruiting, Dept. L, SCT Corporation, Great Valley Corporate Center, 4 Country View Road, Malvern, PA 19355.

Systems & Computer Technology Corporation
An Equal Opportunity Employer, M/F

A PLANNED MOVE

Is preferable in career growth to just another job change. If you are serious about a position that fits **YOUR** CAREER objectives, submit your resume in complete confidence.

Data Processing Careers Are Our Only Business — Nationwide.

Hawkins Associates
La Casa Building
236-Q Montezuma
Santa Fe, N.M. 87501
(505) 982-3884

TRIMBEC EMPLOYMENT CONSULTANTS **inc.** Agy

Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing Field. Send resume, salary history and geographic preference to the attention of Adele Durham, Data Processing Division. All inquiries will receive immediate response.

425 Electronics Parkway
P.O. Drawer 40 Liverpool N.Y. 13088 (315) 451-4220
WE KNOW THE PEOPLE YOU NEED TO KNOW

ROMAC Personnel Consultants
ACCOUNTING & FINANCE • DATA PROCESSING • BANKING

Manager — Manufacturing Systems

Excellent opportunities in Rhode Island, Florida (Sun Belt), and upstate New York for top drawer professionals with heavy systems experience. Your background should include hands-on architecture of MRP modules as Production Control, Raw, WIP, Finished Inventory, Labor Reporting, and Shop Floor Control, subsequently assuming the management direction of activities in these areas. Experience could include a combination of background in Materials Management as well as Data Processing. An advanced degree highly desirable. All positions offer high visibility for continued professional growth.

Salaries to $40,000 **Full Relocation Paid**

All replies kept in total confidence Call or write

In Florida, Dave Dunkel
215 E. Madison Street
Suite 809
Tampa, FL 33602
(813) 228-6327

In upstate NY, Bill Irish
One Marine Midland Plaza
Rochester, NY 14606
(716) 232-4610

In Rhode Island, Al Dunkel
1150 New London Avenue
Suite 210
Cranston, RI 02920
(401) 463-7600

(Many other fine opportunities exist in the 15 Romac offices from Maine to Texas.)

The ROMAC Difference . . . Better

$2,000 REWARD for EDP PROFESSIONALS

InterNorth is committed to the discovery and utilization of our vast natural resources. We are a 3 billion dollar corporation with highly diversified activities. From Alaska, the Gulf of Mexico, Canada and the continental U.S., we are increasing the country's energy options . . . in natural gas, LNG, propane, coal and petrochemicals.

If you have high professional goals and share in our commitment, consider a partnership with InterNorth. We'll back YOUR commitment with a $2,000 employment bonus if you are qualified and hired for the following position.

SYSTEMS SUPPORT SPECIALIST

We have a challenging position for an innovative Technical Specialist in support of state-of-the-art large scale multiprocessing systems and data center operations. Knowledge of the Burroughs B6000/B7000 architecture, MCP operating systems, NDL & DCALGOL is essential. Knowledge of Burroughs RJE, CANDE, GEMCOS, DMS-II, and IBM Data Communications would also be a major plus.

We are implementing a distributed processing network consisting of IBM 4300 systems linked to a Burroughs B7800, and you'll play a major role in developing and supporting the IBM-Burroughs interface and network facilities. If you have a degree and feel you can contribute to this effort by drawing upon related technical experience, creative problem solving capabilities and the ability to work effectively with other EDP Professionals, Users and Management, we can offer you challenge, responsibility and rewards based on performance.

Advanced and progressive management and personnel policies are a hallmark of InterNorth. Salaries are competitive and benefits are excellent including a fitness center complete with a swimming pool, gym, running track, and racquetball courts, plus a company matching savings plan and full tuition refund.

If you feel up to the challenge and meet the qualifications, forward your resume and complete salary history in confidence to: Gene Grimm, InterNorth, 2223 Dodge Street, Omaha, Nebraska 68102

An Equal Opportunity Employer M/F/H

Agency referred applicants will not be eligible for this bonus.

INTERNORTH

DBMS PRODUCT DEVELOPMENT AND SUPPORT

APPLIED DATA RESEARCH, the world's oldest and largest independent systems software products company, currently has available employment opportunities for programming personnel in state-of-the-art product development and support for the Company's Dallas-based **DATACOM DB/DC** product group.

Candidates for all positions must be skilled in IBM Assembly language and have a minimum of 3 years programming experience. Some data base, data communications, and/or systems programming experience very desirable.

ADR OFFERS:

- Competitive base salary **PLUS** semi-annual bonuses
- Superior work environment
- Excellent benefits including hospitalization, major medical, dental, prescription drug plan, tuition assistance, life insurance, long-term disability, paid sick leave and retirement.

Persons desiring to be considered for career opportunities with ADR should forward a resume, in strictest confidence, including salary history to:

Personnel Director
APPLIED DATA RESEARCH, INC.
8515 Greenville Avenue
Dallas, Texas 75243

An Equal Opportunity Employer m/f/h/v

ADR

GET AN EDP JOB ANYWHERE

CALL FREE
0-612/338-6714
CALL COLLECT

Analysts, project leaders, programmers with more than a year's experience let us help you find a better job. For a decade we have been placing EDP professionals like you all over the country through our network of 26 national offices. Send your resume or call

Electronic Systems Personnel
858 TCF Tower, 121 So. 8th Street
Minneapolis, MN 55402
client companies assume our fee.

esp
EDP Placement Specialists
A Member of National Computer Associates

MOVE SOUTH NOW!

Don't wait another winter! We work with over 3,000 sunbelt companies. Our computer will match your skills to their needs. Client companies pay all fees Send resume to: **Data Processing Dept.**

LANDRUM
PERSONNEL ASSOCIATES
P.O. Box 1373C
Pensacola, Florida 32596
CALL TOLL FREE (800) 874-2407

Senior Systems Analyst

International

If you're looking for a fast paced environment with clear potential for advancement, look to the Soflens Division of Bausch & Lomb, whose leadership in vision care continues to build worldwide.

Degree in business related discipline, engineering or systems is required plus strong on-line systems design and analyses background. A minimum of 3-5 years progressive DP experience essential, along with general business knowledge, and background in installing minicomputers and packaged programs. International business exposure and working knowledge of a European language helpful.

Position is based in Rochester, New York and requires 25-30% foreign travel.

For immediate consideration, send resume in strictest confidence including salary expectations to:

Mrs. Shelly Knapp

BAUSCH & LOMB
P.O. Box 450 Rochester, N.Y. 14602

An Equal Opportunity Employer, M/F

ANALYST/ PROGRAMMERS

At Intermedics we are creating new medical technology in the Texas Gulf Coast town of Freeport. It's an exciting environment for people who want to make a difference. If you are a professional who is looking for a rare challenge, consider this opportunity.

DESIGN AND DEVELOPMENT OF STATISTICAL AND GRAPHICS SYSTEMS.

Requires at least 2 years or more experience in program development on mini-computers, preferably D.E.C. including 1 year experience in statistics and graphics.

This position provides an attractive starting salary, excellent opportunity for advancement, company paid relocation, assistance in home selling, company paid insurance, three months temporary living allowance as well as many more benefits.

Qualified applicant may submit a resume in confidence to Professional Staffing Manager, P.O. Box 617, Freeport, Texas 77541, or call TOLL FREE at 1-800-231-2330. We are an equal opportunity employer m/f.

Intermedics Inc.

Our business is life.

ROBERT HALF

PACIFIC NORTHWEST
Washington, Oregon, Idaho & Alaska

PROGRAMMERS/ANALYSTS

Do you have 1+ years experience in business applications? Do you plan to visit or relocate to this area?

If so, we can arrange interviews for you. Call us collect or send your resume and itinerary and we will get right to work.

Ray Magill, CDP
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite 2626
Seattle, Wash. 98101
(206) 624-9000

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 SW Columbia
Suite 650
Portland, Ore. 97258
(503) 222-9778

olivetti

Advanced Technology Center

. . . has career opportunities for graduates

in Computer Science,
Electrical Engineering,
and related fields.

The Advanced Technology Center is a small, advanced R&D facility in Cupertino, doing system development for the Olivetti family. We are involved in intensive efforts in operating systems design and implementation; language and compiler design, support, and implementation; graphics systems; and tools development.

OPERATING SYSTEMS

. . . in the design and implementation of state-of-the-art systems. Development in high-level languages for distributed and stand-alone systems. These systems will be based on latest in microprocessor technology. M.S./B.S. with two years programming experience in a high-level language such as Pascal.

COMPILERS AND LANGUAGES

. . . in the design and development of applications languages, and support of system development languages. Masters or PhD preferred, or equivalent experience.

COMPUTER GRAPHICS

. . . in the design of graphics packages oriented towards the commercial and business market. Development will include design and implementation of software for black & white and color, high resolution graphics displays. Experience in the area of graphics systems design is preferred. B.S. or equivalent is required.

SYSTEM AND TOOLS SUPPORT

. . .Expertise in the UNIX™ operating system. Experience with the structure and internals of the UNIX™ system is required. This includes the development of support tools for other development areas. B.S. or equivalent is required.

We are a small company environment with the advantages of the support of a large corporation. We are located in the South San Francisco Bay Area. The climate and cultural advantages of the area are world famous. Two major universities, Stanford University and the University of California, Berkeley, are located nearby.

Olivetti offers competitive salaries and a complete benefits package. Forward resumes to Mike Meehan, Olivetti Advanced Technology Center, Inc., 10430 South De Anza Blvd., Cupertino, CA 95014. An Equal opportunity employer, M/F.

ADVANCEMENT OPPORTUNITIES

ALL INDUSTRIES - ALL LEVELS - Salaries $20-45,000
NATIONWIDE-FEE PAID-CONFIDENTIAL

Senior Systems Analysts
Programmer Analysts
Application Programmers
Systems Programmers
EDP Auditors
Hardware/Software Analysts
Mini/Micro Specialists

Project Mgrs./Leaders
Data Base Administrators
Mgrs. Systems/Programming
Mgrs. EDP Auditing
Mgrs. Technical Support
Mgrs. Data Processing/MIS
Mgrs. IBM System 3/34/38

For more information, contact or send resume to:

Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

UNIVERSITY OF VERMONT ANALYST PROGRAMMER I

The Administrative Computing Center is seeking an Analyst Programmer I with a Bachelor's Degree, preferably in a scientific or business related discipline. Applicants must have two to four years of experience in systems analysis and programming, two of which must be in COBOL under IBM/DOS. Applicants with experience in higher education applications, on-line systems or DBMS preferred. We offer an excellent benefits package. Salary commensurate with experience. **Send resume and 3 professional references by Dec. 12, 1980 to University of Vermont, OMIC, 238 Waterman Building, Burlington, Vermont 05405.**

An Affirmative Action Employer

WISCONSIN: a great place to live, work & vacation.

PROGRAMMER-ANALYST

Here is your opportunity for:

- **Rewarding work in development of new manufacturing, marketing and financial planning and control systems.**
- **Year-round recreation along Wisconsin's Lake Michigan shoreline.**
- **The quality of life available only in a community small enough to know you, yet large enough to serve your needs.**

MIRRO Corporation is a major manufacturer of housewares, recreational boats and builder products, with corporate headquarters in Manitowoc, Wisconsin. Our Top Management is committed to the evolution of our current net change MRP system into "Closed Loop" Manufacturing Resource Planning. This effort requires the addition of a qualified Programmer-Analyst to our Corporate Systems staff.
Our environment is IBM 4341, DOS/VSE, DL/I.

Required:
Two years programmer-analyst experience in design and installation of manufacturing or marketing systems.
Experience in data base and on-line techniques.
Preferred
Specific experience in sales planning, capacity planning, master scheduling or distributed shop floor control, using ANS Cobol.

Interested? Call our Corporate System Department **collect** between 7:30 and 4:30 CDT, at (414) 684-0291 and ask for Steve Jatczak or Jim Leschke, or send resume in confidence to:

G. R. Benzschawel
MIRRO Corporation
P.O. Box 409
Manitowoc, WI 54220

An equal opportunity employer M/F

TEMPLE UNIVERSITY

Director of Computing and Information Systems

(Search Period Extended From Oct. 15 to Feb. 20)

Nominations and applications are invited for the University position of Director of Computing and Information Systems, a new office now being established.

It will be the responsibility of the Director of this Office to insure, in accordance with the University's academic and administrative priorities, maximum utilization of computer resources in conjunction with the Technical Computer Department, the users, and the computer governance committees. The nature of this position is such that the Director will operate at the highest level of the University.

The qualified candidate's past experiences will enable him/her to effectively relate to state-of-the-art computer technology, computer economics, operations and management, as well as to a diverse body of users and to senior management of the University.

Overall responsibilities of the office include the development and management of a comprehensive plan which enables the University network of 5 separate computer activity departments to function efficiently and smoothly. Specific responsibilities include identification and recommendation of goals, objectives and priorities; the development of policies and procedures for university computing; participation in and solutions to management issues which will insure cost effective utilization of computing services; and maintenance of close liaison with the university faculty and management to insure that educational, research and informational computing needs are recognized and met by the appropriate computing service units. This position is also responsible for contract administration of the facility manager responsible for centralized delivery of academic and administrative computing services.

The candidate, in addition, must hold an advanced degree, PhD desirable. Good interpersonal, oral and written communications skills are essential.

Temple University, an urban state-related university is located in Philadelphia, Penna. Its 14 schools and colleges have research, instructional and public service programs on multiple campuses and enroll 35,000 students. The primary computer center is operated under long term Facilities Management contract with Systems and Computer Technology Corp. The University computer needs are served by 4 internally managed computer departments:

- **Physician Group Practice**
- **Temple University Hospital Computer Activity**
- **Computer Systems Management Group of the Health Sciences Center**
- **Measurement and Research Center**

Resumes should be submitted in confidence by February 20, 1981 to:
KATHLEEN McANDREW, Personnel Department.

TEMPLE UNIVERSITY

Room 203, University Services Building
1601 North Broad Street
Philadelphia, PA 19122

An Equal Opportunity Employer

Promote Yourself!

Move up to increased pay and promotional opportunities and the life style of your choice

PRODUCT MANAGER · Product marketing experience with timesharing vendor. Must have marketing, management & technical skills. Top position with a Fortune 50. Will be responsible for product planning and determination of product mix and market position ..... to $45 K.

MINI-MICRO SOFTWARE DEVELOPMENT - BS CS, EE, or math. 1+ years experience with mini or micro computers in FORTRAN or assembler. Work in CAD/CAM, robotics, or signal processing. Companies in Philadelphia area and rural central Pennsylvania near universities .... to $28 K.

SENIOR PROGRAMMER ANALYST - COBOL, CICS, OS environment. Health insurance background a plus. New development. Low cost of living area .... to $28 K.

SENIOR SYSTEMS ANALYST - Top project in Southwest looking for #2 person. Minimum 2 years experience. Must have payroll/personnel, COBOL, CICS experience. Work in large IBM OS/MVS environment. Also position with leading bank in Southwest .... to $28 K.

PROGRAMMER ANALYSTS - Sunbelt, Midwest, East and West Coasts. Work in development in COBOL, OS, IMS environments .... to $28 K.

And Many More

Through the use of our in-house computer based search system we can assist you in checking out job opportunities almost anywhere. No fees or contracts. Client companies pay all expenses. Career counseling prior to action. Over 10,000 positions represented directly and through affiliates.

SEND YOUR CURRENT RESUME (or an old one with pencil update) together with salary history and location desired in complete confidence or call:

SYSTEMS PERSONNEL, INC.
Suite C700, 207 Fox Lane, Wallingford, PA 19086
Phone (215) 565-2920

Systems Personnel Inc.

A NATIONWIDE CAREER SERVICE
MEMBER OF NATIONAL COMPUTER ASSOCIATES

EDP AUDITOR

Corporate Audit Department of our major, Chicago-based health care organization seeks an EDP Auditor with a minimum of 5 years experience in auditing and data processing. A degree in a related area is preferred. Position will be responsible for the overall EDP audit function and requires an in-depth knowledge of all data processing operations and systems development, including EDP security.

We offer a progressive auditing and EDP environment, a competitive salary, and an excellent benefit package. For immediate attention, submit your resume or a detailed letter with salary requirements, in confidence, to:

Mr. Jerry Hoelscher

Blue Cross &
Blue Shield Associations
676 N. St. Clair
Chicago, Illinois 60611
An Equal Opportunity Employar M/F

---

auditor

BANK EDP AUDITOR

Charter Bank is seeking an individual to assume the responsibilities as EDP Audit Manager. The successful candidate must have a college degree in accounting, business administration, or computer science. An MBA, CPA, or CIA is desirable. Experience required in all phases of computer systems, including development and overall operations, with 3-5 years in the computer audit area. Salary commensurate with experience. We offer complete benefit package. Send complete resume and salary requirements to Personnel Director.

FIRST NATIONAL
CHARTER CORPORATION
500 Charter Bank Center
P.O. Box 38
Kansas City, Mo. 64183
Equal Opportunity Employar M/F

COMPUTER PROFESSIONALS

LIFE IS BETTER IN DALLAS!
$18,000 TO $35,000

Since 1970 we have specialized exclusively in the successful counseling, representation, and career advancement of hundreds of computer professionals like yourself. Currently we have numerous opportunities for

- COBOL, ALC (BAL), RPG, PL-1, FORTRAN Programmers, Programmer/Analysts
- IBM DOS, VM, OS/VS1, SVS, MVS, CICS, IMS System Programmers
- Mini Computers/Real Time Programmers
- Marketing/Marketing Support Reps

Send your resume or call us today! We know the Dallas data processing marketplace. Fees paid by client companies

DataPro
DATA PROCESSING
PERSONNEL
CONSULTANTS

5580 LBJ FREEWAY SUITE 650-C
DALLAS, TEXAS 75240 (214) 661-8600
Member of National Computer Assoc

WHY CHANGE JOBS?

Excitement is only one reason.

Now available, new positions with our firm's growing computer department - management, programming, support staff - expanding 500% yearly. That's exciting.

Hewlett Packard and Burroughs have said we are producing one of the world's most innovative control, structure, design and software in the world. Now, that's exciting!

Our people stay. Why? Because they're excited! HP and Burroughs experience qualify you for a move to our dynamic multinational firm, located in beautiful Marin County, away from the "pack."

Why change jobs? To become part of the best, to challenge yourself, to enjoy the job satisfaction you deserve. If you have an independent, creative mind, we have one question: won't you join us? Contact:

Gary Nelson
& Associates Inc.
PO Box 4370
San Rafael, CA 94913
(415) 479-5101

FLORIDA BANKING ANALYSTS

Our client, one of the leading South Florida financial institutions, is interested in EDP banking professionals. They are currently experiencing a rapid expansion program in their progressive 370/158 installation and have openings at various banking software packages including NCP or CPCS will help you to become a member of this aggressive team. This top notch institution offers an extremely liberal benefit package as well as payment of all relocation expenses to qualified candidates. Salary to High 20's.

HALF

Please call or rush resume and salary history in confidence to:

Chuck Neil

ROBERT HALF
OF MIAMI, INC.
1395 NW 167 St /Suite 100
Miami, FL 33169
Dade (305) 625-5433
Broward (305) 764-1550

MAJOR MIS EXPANSION

Sunbelt Location

Fortune 100 Corporation has immediate career opportunities for the MIS Professional seeking technical development, rapid advancement and visibility. These positions have been created as a result of internal growth, promotions and continued expansion of the information systems organization. You will have the opportunity to enjoy working in a dynamic environment utilizing IBM's most current state-of-the-art technology and tools.

BUSINESS SYSTEMS

* Project Leader/On-Line, Financial Salary $32-$34K
* Sr. Planning Specialist - Salary $30-$35K
* Sr. Systems Analyst, Manufacturing Salary $30-$33K
* Sr. Systems Analyst, Financial - Salary $30-$33K
* Sr. Analyst Operations Research and Scientific Salary $25-$30K
* Sr. Programmer Analyst, Financial Salary $25-$28K
* Programmer Analyst, Financial and/or Manufacturing-Salary $23-$27K

SYSTEMS SUPPORT

* Manager of Technical Support - $38-$44K
* Data Base Manager, IMS - Salary $33-$38K
* Sr. Systems Programmer, MVS - Salary $32-$35K
* Data Base Specialist, IMS - Salary $31-$34K
* Software Programmer, IMS, and/or MVS - Salary $28-$32K

We offer an outstanding benefits package which includes all relocation and real estate costs as well as the opportunity to enjoy year round outdoor recreation. Send your resume with complete confidence to:

CW Box 2449
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701
An Equal Opportunity Employar M/F/H

COMPUTER HARDWARE SERVICES & SALES

Join our rapidly growing computer service company. We offer unlimited opportunity to those with initiative and ability. Systec provides a full benefit package, top salaries, and participation in Systec's future.

Immediate opening for field engineer with IBM 360/370/303X plus plug compatible CPU and peripheral experience. We also need top notch DEC people now!

If you are ready for a company where your abilities and contributions will be recognized and rewarded, call today. At Systec you are not just a part of the company . . . YOU ARE THE COMPANY.

Phone: 800-327-2202 In Fla.-305/323-0230

SysTec

2715 Navigator Ave.
P.O. Box 2015
Sanford, Florida 32771

Equal Opportunity Employer m/f

Experienced Programmers and Analysts

Send resumes to: Mark C. Grove, Recruiting Office, Ætna Life & Casualty, 79 Farmington Avenue, Hartford, CT 06156, (203) 273-6828. An equal opportunity employer.

Ætna
LIFE & CASUALTY

CHARGE US!

(You can charge your subscription to Computerworld on American Express, Visa or Mastercharge)

COMPUTERWORLD

SAN FRANCISCO

If you're a professional, use a professional in your search, it works.

- Systems Programmers
- EDP Auditors
- Data Base Administrators
- Systems Analysts
- Programmers—PASCAL, COBOL, PL/1, RPG II, FORTRAN
- Project Leaders—Banking, Manufacturing, Retail
- Marketing Support Programmer/Analysts
- Technical Writers
- Mini's—Programmers, Analysts, User Liason

All fees assumed by clients. We have over 1,000 positions in the Bay Area...Call Collect.

ROBERT HALF OF NORTHERN CALIFORNIA, INC.

Jerry Anderson • Bob Couch • Linda Strickland
111 Pine Street, 15th Floor
San Francisco, Ca. 94111
(415) 434-1900

Jim Dupre
2 Palo Alto Sq., Ste. 212
Palo Alto, Ca. 94304
(415) 493-8700

Gene Gutt
675 N. 1st St., #609
San Jose, Ca. 95112
(408) 293-9040

SENIOR PROGRAMMER ANALYST

The HP Way: encouraging technical contribution

Senior Programmer/Analysts

The HP Way—it's freedom to establish your own work plans and methods to achieve HP objectives. It's opportunity for professional satisfaction and success.

If the HP Way sounds like your way, here's an opportunity to contribute your technical expertise.

We're enhancing our entire corporate information system, including payroll, benefits and taxes. You will help us improve existing systems and design new ones to meet the needs our our HP users. You'll be involved in this entire project from development to start-up and may direct many sub-projects in support of this major system.

You should have a B.S. in Computer Programming or the equivalent combination of education and experience. A minimum of four years related programming experience or an M.S. degree is desirable. You must have two years experience on IBM and Amdahl mainframes with MVS, COBOL and TSO/SPF. A strong development background with accounting experience is a plus.

HP offers a comprehensive program of benefits offered to all employees. Among these are cash profit sharing, stock purchase plan (up to 10% of salary), basic life and group medical, dental and disability insurance, and retirement plan.

Please send your resume, including salary history, in complete confidence to Lindy K. Latham, Professional Employment, Hewlett-Packard, 1501 Page Mill Road, Palo Alto, CA 94304. Equal opportunity/affirmative action employer.

HEWLETT PACKARD

CMIS operating systems

discover FMC career opportunities in Indianapolis

FMC is a highly diverse international machinery and chemical producer with facilities in 35 states and 13 foreign countries, employing in excess of 40,000 employees.

Indianapolis, the home of FMC's Corporate Computer Center, Is a state-of-the-art environment which includes multiple IBM 3033's growing at the rate of an additional CPU every eight months. Our environment includes MVS/NJE, IMS/VS, DB/DC, CICS/TOTAL, ACF/NCP/VTAM/MSNF, TSO and other configurations. Indianapolis is a major regional trade manufacturing and research center with advanced educational facilities, family entertainment and affordable housing. We offer the challenge and possess the environment to meet your career objectives and professional growth.

The Corporate Computer Center provides computer services for FMC's 140 plus operating facilities and functions as a Time Sharing operation for a large network of users.

We offer competitive salaries, educational assistance, retirement, life and medical insurance, disability coverage, participation in the company supported thrift, savings and stock plan, liberal vacations, holidays and a generous relocation package.

Recent promotions and expansion have created the following opportunities for:

manager of systems programming (center support)

systems programming section manager (center support)

sr. system programmer (VTAM/NCP)

sr. system programmer (DBA)

lead computer operator (MTO)

sr. computer operator

For immediate attention, please forward a resume, including salary history, in complete confidence to **David S. Cornelius, P.O. Box 41365, Indianapolis, Indiana 46241, or call collect (317) 248-6021 or 6022 from 8:30 A.M. through 5:00 P.M.** Day, evening and weekend interviews can be arranged. Investigate FMC Career Opportunities; you will be glad you did. We are an Equal Opportunity Employer, M/F.

FMC

A BARGAIN . . . IS A BARGAIN . . . IS A BARGAIN

NOW CLASSIFIED ADVERTISING IN InfoWorld IS EVEN MORE OF A BARGAIN

Classified advertising in *InfoWorld* is growing because it's working! Line ads as low as $13.50. A 4 inch display ad costs only $84.00. And for you, a special deal! Mention this ad and receive a **10% discount.** To place an ad or receive a complete media kit, call Lynne Matthes.

Outside California call **TOLL FREE**
(800) 227-8365

Inside California
(415) 328-4602

What Can One Coupon Get For You?

A Free Resume Kit...

an invaluable aid in your first step in your job changing process.

Scientific Placement, Inc., has put together its FREE RESUME KIT to assist computer professionals in presenting themselves to their best advantage to prospective employees. The kit presents in an uncomplicated format what years of experience in the employment service to the computer industries have taught us.

To benefit from our expertise, complete the information below and return it to us. We'll send you our Kit, no strings attached. (For Computer Professionals only.)

Name	Degree Yr. Grad.
Address	Current Employer
City State	Job Title
Zip	Phone
Hardware	Languages
Applications	No. Yrs. Experience

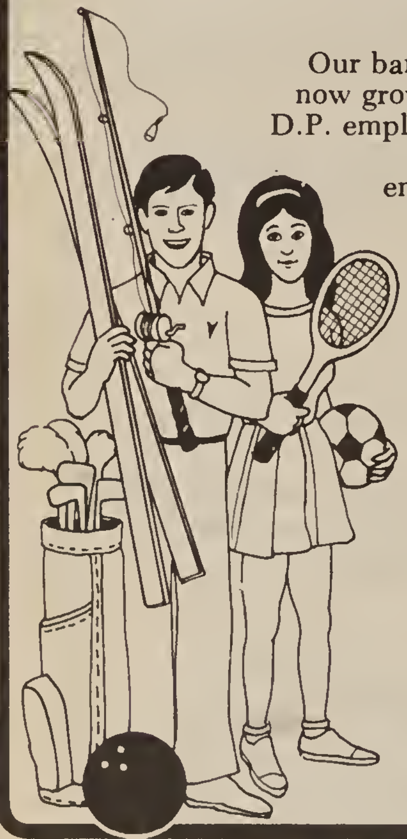
We have many exclusive Data Processing positions available — locally and nationwide.

Scientific Placement, Inc. Employment Service
P.O. Box 19949 Houston, Texas 77024 (713) 496-6100 CPW08/11/80

YOU BET CLIMATE IS EVERYTHING!

We don't mean just Sun Belt temperatures. We also provide the right climate for your climb to success. Because it's everything to us too.

• STAFF EXPANSION '80 & '81 •



Our bank and it's subsidiaries have now grown to 4 data centers, 950 + D.P. employees, 7000 total employees in a 200 + branch banking environment. Our equipment ranges from 370/135 through 3033 &4341.

Let's Discuss Sunny Climes and Climbs.

Call Rich, Mike or Sue at (602) 261-1591 collect. (No agencies please) or mail your resume to:

VALLEY NATIONAL BANK
OF ARIZONA
Attn: Sue Felsch
P.O. Box 71 CW9 A301
Phoenix, AZ 85001

an equal opportunity employer m/f

Programmers, Analysts, lend us your years!

Your years of experience in Data Processing . . . so that we can go to work to find the precisely right position for you. One that's growth-oriented. One that's satisfying. We're D.P. recuiting specialists who deal in no other field. So we know what we're talking about. Simply call or write in confidence:

N Y —535 5th Ave , New York 10017 (212) 867-2650
N J —30 Vreeland Rd , Florham Pk 07932 (201) 966-0900
Calif —3255 Wilshire Blvd , Los Angeles 90010 (213) 384-4900
Texas—3050 So. Post Oak Rd , Houston 77056 (713) 961-3600

the jarvis walker group

TULSA

MVS INTERNALS

Mejor energy firm requires en experienced MVS Systems Programmer for support of its multiple mainframe IBM installation. Ideal living and working condition, salary to Mid $30's.

2624 E 21st St Tulsa OK 74114
(918) 747-3621

DATA PROCESSING CAREERS inc

KANSAS CITY

SECURITY ANALYSTS

An outstanding KC compeny is seeking experienced Systems Security Anelysts & Dete Security Anelysts to help develop the corporate security progrem. Selery in the $20's.

6405 Metcalf Shawnee Mission,
Kansas 66202, (913) 236-8288

DATA PROCESSING CAREERS inc

DALLAS

MANUFACTURING SYSTEMS ANALYST

Our client needs strong background in menufecturing epplicetions design, COBOL skills, prefereebly on 370 equipment. Degree preferred. Full relo to Dalles.
Salary to $26k.

Suite 1109, Stemmons Tower W.
Dallas, TX 75207, (214) 637-6360

DATA PROCESSING CAREERS inc

FT. WORTH

CICS PROFESSIONALS

Opportunities ebound for the person with 1+ yeers Command level experience. Clients include benking, manufacturing, services and oil & gas, with top growth prospects. Relo & interview paid. Salary to $28K.

Suite 911, One Summit Ave
Ft Worth, TX 76102 (817)336-4565

DATA PROCESSING CAREERS inc

SUNBELT OPPORTUNITIES

Systems Anelyst (2) - COBOL, CICS, Lerge Scele IBM	to $26K
Programmers (2) - 2 to 3 yrs. COBOL, CICS + +, OS & DOS	$17 - 25K
Sr. Programmer/Analyst - 3 to 5 yrs. COBOL, 2 yrs. commend level CICS	To $30K
Programmer - 1+ yrs. VRX COBOL end/or Neat 3	$18 - 20K

ALL FEES PAID BY EMPLOYERS

**ROBERT HALF
OF MEMPHIS, INC.
825 Ridge Lake Blvd.
Memphis, TN 38119
(901) 683-5800**

COMPUTER PROGRAMMER/ SOFTWARE ENGINEER

Immediate Opening

Challenging management-oriented position in newly formed software quality assurance function. Assignment will be on highly complex and sophisticated avionics systems in preliminary developmental phase. Presents opportunity to participate in the complete software development cycle.

REQUIREMENTS:

B.S. in math, computer science or electrical engineering . . . Experience in areas such as structured programming, assembly language, program design, software quality and systems analysis . . . Strong verbal and written communications skills. We offer an excellent benefit program and a salary commensurate with experience.

Send resume, in confidence, to Edward G. Weiser, Employment Supervisor, Bell Aerospace Textron, P.O. Box 1, Buffalo, New York 14240

Bell Aerospace TEXTRON
Division of Textron Inc.

An Equal Opportunity Employer M/F/Hc

EXXON OPPORTUNITIES

for

Scientific Programmers, Systems Analysts and Systems Programmers

Exxon Production Research Company, Houston, Texas, one of the largest exploration & production research organizations in the world is currently developing a computer network to handle exploration data processing needs.

If you are a recent BS, MS, or PhD graduate in the fields of:

•Math •Computer Science
•Physics •Electrical Engineering

with experience in:

•IBM OS/MVS •CRAY-1 Vector Computer
•Distributed Processing
•Interactive Graphics & Image Processing
•Seismic Applications Programming

send your resume to:

**W.S. Waters, Technical Recruitment
Department 160
Exxon Production Research Company
P.O. Box 2189 • Houston, Texas 77001**

EXXON PRODUCTION RESEARCH
EXXON
an equal opportunity employer, m/f

EDP SPECIALISTS

career search opportunities

$18,000 — $50,000

M.I.S DIRECTOR to $43,000. Major consumer div/"Fortune 250" corp. Develop operational information systems/multi-location for centralized/distributive processing. Large IBM strong project mgmt skills/hands-on approach. Mfg exp. Degree. Ohio metro. Refer AT.

SYSTEMS PROGRAMMER — VTAM/IMS, $40,000. Specifically needed is knowledge of VTAM & IMS DB/DC generation, operational, maintenance & tuning parameters & techniques; expertise in use of SMP for IMS DB/DC. Refer NS.

TELECOMMUNICATIONS MGR. to $40,000. Excellent state-of-the-art oppty w/leading firm. Req's exp in satellite cable, telephone, microwave & broadcast w/strong hardware & software knowledge. Refer GR.

SYSTEM DESIGN — LIFE SYSTEMS, $35,000. Ground floor oppty w/$1 billion corp moving off service bureau & commitment to MIS excellence. Req's CFO LIFE 70/COMM exp. Refer HG.

MGR. SCIENTIFIC SYSTEMS to $35,000. Market research function/major corp. Direct scientific solutions to business problems tech staff/operations research/quantitative approach. Computer systems dvlpmt. MS degree. Ohio metro. Refer AT.

SYSTEMS ADMINISTRATOR to $32,000. Corp hdqtrs "Fortune 200" diversified mfg corp seeks Administrator to take charge of installation of new IBM 4300 distributed systems. High visibility, authority. Excellent career oppty. Refer DM.

CONSULTING (TECH SUPPORT) to $30,000 +. Major consulting firm seeks individual to evaluate operating systems, act as a "sounding board" in all technical aspects including performance measurement tools. Req's 5+ yrs IBM environment; strong bkgd in tech support. Excellent growth. Refer RS.

HONEYWELL SR. PROGRAMMER ANALYST to $30,000. An industry leader in Phila metro area has prime oppty for Individual w/GCOS/GMAP exp. Refer GR.

SYSTEM 3/34 PROGRAMMER ANALYST to $25,000. Oppty to grow w/expanding "Fortune 500" mfr. On-line or CCP exp helpful. Refer GR.

CONTACT OUR NEAREST OFFICE ABOUT THESE AND OTHER FEE-PAID OPPORTUNITIES. OUR UNIQUE, COMPANY-OWNED OFFICE SYSTEM ASSURES PERSONAL, CONFIDENTIAL SERVICE.

PHILADELPHIA, PA 19102 — S Burns, 1500 Chestnut St., 215/561-6300
ATLANTA, GA 30346 — R. Spang, 47 Perimeter Center, 404/393-0933
BALTIMORE, MD 21204 — R Nelson, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 28202 — J Schwab, 1742 Southern Nat'l Ctr., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 4401 Rockside Road, 216/524-6565
McLEAN, VA 22102 — D. Miller, 1710 Goodridge Drive, 703/790-1335
NEW YORK, NY 10036 — N. Shanahan, 1211 Ave. of the Americas, 212/840-6930
PITTSBURGH, PA 15222 — B. Sayers, 4 Gateway Center, 412/232-0410
PRINCETON, NJ 08540 — G. Romagna, Route #1, CN 6100, 609/452-8135
WILMINGTON, DE 19810 — H. Green, 3516 Silverside Rd., 302/478-5150
HOUSTON, TX 77098 — G. Smith, 3000 Richmond Ave., 713/523-5586
LOS ANGELES, CA 90017 — W. McNicols, 707 Wilshire Boulevard, 213/623-3001
SAN FRANCISCO, CA 94111 — W McNichols, 601 Montgomery Street, 415/392-4353

fox·morris
personnel consultants

We are seeking to fill

546 EDP Job Openings in the San Francisco Bay Area

You'll find little evidence of recession in the computer careers market in the San Francisco Bay Area. Growth continues at a rapid and steady pace, with heavy demand at all levels for qualified EDP personnel. Our client companies pay all fees, interview and relocation expenses:

The Computer Resources Group, Inc., is a long-established (9 years), highly respected (150 leading companies utilize our services), and alert organization (our data bank of computer professional needs is unmatched in the San Francisco area).

Send us your resume today or call collect.

COMPUTER
RESOURCES
GROUP INC.

303 Sacramento Street, San Francisco, CA 94111
(415) 398-3535 or 3333 Bowers Avenue, Suite 130
Santa Clara, CA 95051 (408) 727-1658
AFFILIATES IN 25 MAJOR U.S. CITIES
National Computer Associates

An employer-retained professional placement service

ROBERT HALF

FLORIDA DOS/VS

P/A - Banking DDA	18K	Super - Sys Prog-CICS	28K
P/A Mfg and Acctg appl	20K	Proj Ldr - Mfg & acctg	24K
P/A - Acctg appl	18K	Sys Prog - CICS	24K
P/A - Transportation	24K	Teleprocessing - 2+ yrs	24K
P/A - Payroll/Pers	20K	Sr. P/A - Order Entry	22K
P/A - Heavy BAL	18K	Anal - City govt	22K
COBOL and RPG	20K	Data Base Anal - 2 yrs	25K
P/A - 2 yrs - any appl	19K	Anal-Mfg Appl	25K

Many others to choose from. All fees and relocation paid. Mail resume/call collect.

STAN ALLEN

ROBERT HALF OF TAMPA, INC.

1311 N. Westshore Blvd., Tampa, FL 33607 (813) 876-4191

MANAGER OF PROGRAMMING

The Montana Power Company has an immediate opening for a Manager of Programming in the Computer Services Department. Will be responsible for managing work of project managers and analysts. Must have extensive Project Management experience. Knowledge of IBM machines and systems. Excellent salary and benefits package. Send resume to:

Ms. June Ralph
Montana Power Company
40 E. Broadway Butte, Montana 59701
An Equal Opportunity Employer

mpc

---

playtex

T.M.

• *APPLICATIONS DEVELOPMENT*

• *DATABASE MANAGEMENT*

Advanced automation and MIS have helped us become world famous . . . bring your skills to a company that appreciates and rewards innovation in every area of our business.

International Playtex, Inc. is an expanding, technically progressive organization, a major subsidiary of the $6-billion Esmark Corporation. We constantly search for and apply the latest and most efficient means for manufacturing and marketing our world famous lines of intimate apparel and family products.

Computer applications will continue to play a central role in our success. Those who join us will discover a professional environment and team approach that promotes broadened technical exposure and significant career advancement.

Our location permits our employees to live in relaxed suburban-to-rural communities where housing costs are low and the tax picture is quite favorable. In addition we are close to some of the nation's finest recreation areas (Chesapeake Bay/Delaware Bay) and have ready access to several major metropolitan areas. Relocation will be assisted (including reimbursement of realtor's commission on the sale of your home).

ORDER ENTRY SYSTEMS

- PROGRAMMER/ANALYSTS
- ASSOCIATE PROGRAMMER ANALYST

Participate in the development of on-line order entry systems by the use of portable remote data terminals. Systems involve developing ordering algorithms, replenishment algorithms, promotional allocations and sales forecasting.

DISTRIBUTION SYSTEMS

- SENIOR PROGRAMMER ANALYSTS

Participate in the development of inventory management systems to support replenishment, order tracking, warehousing control and transportation systems.

FINANCIAL LEADER

- PROJECT LEADER - *MBA Finance or Business Admin. a plus*

Participate in the development of on-line financial information systems to support financial analysis, the production of financial schedules, financial modeling and profit planning systems.

MARKETING/SALES SYSTEMS

- PROJECT LEADERS
- PROGRAMMER ANALYST

- prior experience in the use of FOCUS or RAMIS a plus

Participate in the development of historical data retention systems and on-line interactive decision support systems. Systems will be oriented to the use of a high level software development tool to support random on-line retrieval inquiry. Effort supports headquarters marketing/sales organization located in Stamford, CT.

REQUIREMENTS:

All positions listed above require bachelors degree or equivalent education, training and/or related work experience plus:

- **Project Leaders** - 8 years experience as a programmer/analyst, including minimum 2 yrs. exp. as Sr. Programmer Analyst.
- **Sr. Programmer/Analyst** - 6 years experience as programmer/analyst.
- **Programmer/Analyst** - 3 yrs. experience as programmer or analyst.
- **Associate Programmer Analyst** - 1 year of programming experience.

DATA BASE ANALYST

Responsible for working with Applications Systems Designers to develop new data base systems and to upgrade existing data base systems in an IMS DB/DC environment. Design physical data bases in support of logical, performance, integrity and security requirements. Coordinate implementation activities, assist junior data base designers, provide training, documentation and consultation to all personnel relative to data base development procedures and facilities. Requires minimum of 2 years DB/DC system and data base design experince, minimum of 1 year IMS experience and bachelor's degree or equivalent.

Please call (302) 674-6133 COLLECT, or mail your resume, including salary history, to Paulette Peterson, Recruiting Manager:

International Playtex, Inc.

Box 631, Dover, Delaware 19901
An Equal Opportunity Employer M/F

Your Ultimate Choice

TRANSFER OVERSEAS AFTER INTERIM U.S. ASSIGNMENT

Salary area $35,000

Process computer systems and hardware engineers needed to join one of the world's largest petrochemical companies to provide a high level of technical and professional assistance, advice and guidance in the development and utilization of new and existing computer systems.

B.S. degree in C.E. or related fields, continuous process petrochemical experience project related are the keys to many exciting positions.

For further information contact Ron Timm, data processing specialist, at

(713) 658-9898.

ALL FEES ASSUMED BY CLIENT COMPANIES

Please submit salary history with your current resume.

M.david lowe
PERSONNEL SERVICES

476 Houston Natural Gas Bldg.
1200 Travis
(713) 658-9898
Houston, Texas 77002

Systems Analyst/Programmer

IBM 370/138 DOS/VS

Morrison Incorporated is seeking a Systems Analyst Programmer to be based in Mobile. You should have 3 to 5 years experience in Cobol, Systems Analysis and design for CICS applications. You will be responsible for planning and leading the development of an on-line Distributed System. Excellent benefits package, salary DOE.

Call Mr. Head at 1-800-633-1330 or mail resume with salary history to Morrison Incorporated, P.O. Box 160266, Mobile, Alabama 36625. EOE

UNIVERSITY OF VERMONT

DEC Senior Systems Programmer

The Academic Computing Center requires a systems programmer to help maintain a DEC 2060 system running under TOPS-20. Responsibilities include maintenance of the operating system, system utilities, and language compilers. Some experience with graphics hardware and software and telecommunications is also needed. Applicants should have a B.A. in computer science or a related field, 5 years experience with a time sharing computer system, 2 years experience with Fortran, and 3 to 4 years experience with TOPS-10/20 at the system level. Salary is high teens to low twenties with excellent fringe benefits package. Please submit resume with cover letter along with names of 3 professional references. For further information contact **Dr. David Whitmore, Academic Computing Center, University of Vermont, Cook Building, Burlington, Vermont 05405.**

An Affirmative Action Employer

APPLICATION PROGRAMMER

Cody, Wyoming

Husky Oil, a fully integrated oil company, has an immediate opening in its Cody, Wyoming offices for an Application Programmer with 2-5 years OS/VS or related IBM experience.

If you are a COBOL Programmer and your lifestyle could include a small city in the Rocky Mountain West, please send your resume and salary history to:

Dona Copeland
Husky Oil Company
P.O. Box 380
Cody, Wyoming 82414

Husky

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYSTS

Philips Industries Inc. is a major manufacturer of products used in the residential, commercial, industrial and agricultural building industry.

Owing to major system development plans in our Data Processing Department, we must find capable individuals to fill these positions. Applicants must have considerable experience in a business D.P. environment with a solid background in COBOL, CICS On-line, and system design. In addition, we require professionals who are familiar with OS/JCL, Data Base, and large IBM main-frame (370). Manufacturing systems experience very helpful.

We offer a salary that is commensurate with your experience along with a wide range of company paid benefits. Send resume and salary history to:

Bonnie Filoso
Philips Industries, Inc.
4801 Springfield St.
P.O. Box 943
Dayton, OH 45401
513-253-7171

PHILIPS
INDUSTRIES INC.

An Equal Opportunity Employer M/F

Manager
Management Information Services

EAF International is a corporate business jet management company based in northern New Jersey. We are a leader in our market segment and employ over 130 skilled and professional personnel. Long range expansion of EAF has created an exciting and unique opportunity for a talented individual to assume the duties of Manager, Management Information Services. This position is a ground floor opportunity and offers high visibility within the corporation. The individual will report to the Office of the President and will have an opportunity for general management responsibilities within 2-3 years. Initial responsibilities will include the establishment of an MIS Department and the implementation of Wang's 2200VS computer and Software International's software packages. Starting salary will be in the $30-40,000 range, depending on qualifications. Technical background should be minimum of 3-5 years of systems design and project management experience, MBA degree or equivalent, hardware and application knowledge, business and industry experience.

If you possess leadership qualities, strong interpersonal skills, and are looking for a career opportunity in small but dynamic company environment, please contact us.

Please submit resume including salary history in confidence:

Office of President
EAF International, Inc.
118 Billy Diehl Rd., Teterbor , N.J. 07608

PROGRAMMER ANALYSTS

• San Diego •

TELEDYNE RYAN AERONAUTICAL is the world's largest manufacturer of pilotless jet target aircraft and remotely piloted vehicles used by our nation's military. We are currently seeking programmer analysts with 3-5 yrs. experience in the design and implementation of scientific/engineering computer software used in the analysis of aerospace engineering problems. Must be knowledgeable in the use of PL/1 and FORTRAN, IBM series computers, and Batch, as well as interactive computing techniques. BS degree in Engineering, Computer Science, Math or Physics.

Please send resume
or call collect
(714) 291-7311 Ext. 1104
John Kenshalo/Will Brockman

TELEDYNE
RYAN
AERONAUTICAL
2701 Harbor Dr.
San Diego, Ca. 92138
Equal Opportunity Employer

Arizona/California/Texas/Colorado/Florida

SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $18-35,000.

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.

For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.

For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.

Your name, resume, and present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:

Dan Pullman (602) 274-5660
PULLMAN PERSONNEL
3003 North Central Ave. Suite 1706, Phoenix, Arizona 85012

APPLICATIONS PROGRAMMER ANALYST

Work in growing Information systems division of 452 bed community hospital located in central California. Beautiful recreational area near 3 national parks. Department plans include sophisticated on line distributive processing with DEC-20 and PDP-11 series. Programming languages include MACRO, COBOL, and FORTRAN. Applicants should have at least 2 years programming in business and hospital applications. Send resume and salary requirements to:

Personnel Dept.
Fresno Community Hospital
P.O. Box 1232, Fresno, CA 93715
209/442-6000, ext 3712.
An affirmative action, equal opportunity employer.

LOOKING FOR COMPUTER PEOPLE?

525,000 computer people look at Computerworld every week.

Readers* at computer end-user organizations – 320,000

Programmer/Methods Analyst	84,200
Systems Analyst	54,500
Director/Manager/Supervisor of DP	51,500
Systems Manager	35,900
Director/Manager of Operations/Planning/Admin. Svc.	28,400
VP/Assistant VP	11,100
Manager/Supervisor of Programming	7,100
Treasurer/Controller/Financial Officer	7,000
Applications and Other Engineering	6,900
President/Owner/Partner/General Manager	3,900
Other	29,300

Readers* at OEM's, system houses, mainframe manufacturers and other vendor organizations	**135,000**
Readers* at consultant organizations	**70,000**
Total Readership	**525,000**

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

For more recruitment advertising information, call Bill Mills, Classified Advertising Manager, (617) 879-0700.

*Includes paid circulation in United States and Canada plus pass-along readership as estimated by Becker Research Corporation, July 1979. Pass-along readership differs in the three classes of organizations, but averages 4.3 readers per issue

San Francisco

$25,000-$35,000+

Scicon is a leading international computing services group. With annual revenues of over $100 million, we have successfully completed over 5,000 projects for clients in 50 countries.

Scicon is an acknowledged world leader in the provision of systems and services to the Energy, Industrial, Financial and Government markets. The increasing demand for our services has created openings in the Bay Area for suitably qualified systems professionals.

Our current requirements are for Systems Consultants, Systems Analysts and Analyst/Programmers with a minimum of two years' experience in one or more of the following:

- **General Business Systems**
- **BASIC, COBOL, FORTRAN**
- **DEC VAX 11/780**
- **Technical Applications**

If you are looking for a career move to a progressive, challenging and highly rewarding environment where your individual contribution will be encouraged and recognized, consider Scicon. In addition, we provide an excellent benefits package and career development opportunities.

For further information, send your resume, or call us at:

Scicon North America
201 California Street
San Francisco, CA 94111
(415) 445-9712

An Equal
Opportunity
Employer

Scicon

CALIFORNIA

GLENDALE — Join a systems programming team and upgrade your skills from VS1 to MVS and CICS. Requires a minimum of one year systems programming experience. Salary to $30,000.

LOS ANGELES — Use your OS COBOL skills and join a team to develop on-line CICS inventory control and financial systems. Some coding will be involved. Requires a minimum of 2 years, 370/OS COBOL. Company will train CICS. Salary to $27,000.

CENTURY CITY — Prestigious corporate div. of int'l conglomerate seeks P/A who is ready to move into systems. Large scale IBM systems exp, coupled with financial appls. & a degree would qualify. Salary to $30,000.

SAN FERNANDO VALLEY — Div. of international firm seeks several Sr. P/A's to act as internal consultants. COBOL/OS required. Any Data Base a plus. Company will train IMS and TSO/SPF. Salary to $27,000.

the jarvis walker group

3255 Wilshire Blvd., Suite 1503
Los Angeles, Ca. 90010 (213) 384-4900

SYSTEMS PROGRAMMER

CETUS CORP., a leader in biotechnology, seeks a highly experienced DEC systems programmer for our PDP 11/45 and future VAX 11/750 computer. This computer system is used to support both our scientific and administrative functions. You will be responsible for conversion to the VAX and systems software of both systems, ensuring their efficient operation. Assisting application programmers and biologists with system related problems will also be a major responsibility. Familiarity with VAX is not necessary, but in-depth knowledge of another DEC system is essential. Proficiency in FORTRAN and good communication skills are also required. Knowledge of computer hardware, graphics, data base structure, statistics and biology would be helpful. We offer flexible hours, an informal atmosphere, excellent benefits and salary commensurate with experience. If you are interested in a challenging position with opportunity for professional growth, please send your resume to:

CETUS CORPORATION
Box 22
600 Bancroft Way
Berkeley, CA 94710
EOE

MIS Professionals:

make the intelligent choice with apple!

s.f. bay area

Apple Computer, an aggressive, innovative leader in the personal computer industry, offers an intelligent choice to ambitious MIS professionals. Apple is entering 1981 after an impressive 300 percent growth in fiscal 1980. We're looking for self-motivated individuals who can operate in our high-growth environment to help us meet our goals for the future.

- **systems analysts**
- **programmer/analysts**

Openings exist at various levels, requiring a minimum of entry-level to 5 years' experience and a BS degree or equivalent. Familiarity with DEC PDP-11/70, RSTS/E and NCA software highly desirable.

Apple pays top salaries and has one of the finest fringe benefits packages available. Make your own intelligent choice after you investigate Apple. Call **Vicki Milledge at (408) 446-8429**, or send your letter/resume to her attention at **Apple Computer Inc., 10260 Bandley Drive, Cupertino, CA 95014.** An equal opportunity employer, m/f/h.

apple computer inc.

SR. TECH WRITER

Prosperous software org. seeks creative & articulate EDP writer for new user & tech. support projs. Will coordinate, plan & implement user doc. in multi-product environ. Career oppty. with industry leader. (Fee Paid). Salary $24,000. Contact Paul Blanchard.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

COMPUTER SCIENCE OPENING

St. Lawrence University invites applications for a tenure track position at the assistant/associate level beginning September 1, 1981. We require a Ph.D. in one of the mathematical sciences or in computer science. The teaching will be primarily in computer science but occasionally in mathematics such as numerical analysis. Teaching load is 3 courses per semester. The emphasis at SLU is on quality teaching but professional development is expected. The facilities at SLU include UNIVAC 90/80-3 with VS/9 operating system and 18 terminals. Also 2 Tektronix 4052's and 4 IBM 5100's. Closing date for application January 19, 1981.

Send resume to: Daniel J. Fleming, Mathematics Dept., St. Lawrence University, Canton, N.Y. 13617. An equal opportunity employer m/f.

Sr. Systems Analyst/Programmer
Jr. Systems Analyst/Programmer

Due to expansion and growth, a large leading medical facility located in Central Texas is presently offering opportunity to ambitious System Analyst/Programmer professionals. Excellent working conditions, living in a pollution free area among the friendly Texas atmosphere. Tops in benefits including medical service to immediate family D.P. running on a 370-158 utilizing DOS/VS, CICS, DL1 data base, COBOL and some RPG.

Send Resume to:
Mildred Lewis
Scott & White Hospital
2401 S. 31st. St.
Temple, Texas 76508
EOE

CORPORATE DIRECTOR - INFORMATION SYSTEMS

THE COMPANY:

Harte-Hanks Communications, Inc., a diversified, rapidly growing communications company, owns and operates 28 daily and 68 non-daily publications in 43 markets. The New York Stock Exchange listed company also owns and operates four VHF network affiliated television stations, five AM and six FM radio stations, two trade publications, three alternate distribution companies, four CATV systems and three market research firms. Most of the company's operations are in the Sunbelt. Over the past five years, earnings and revenue growth have been excellent, making the company a leader in the communications industry.

THE JOB:

Reporting to the Corporate Vice President, Staff Services, this key executive will be responsible for providing systems development and processing services to over 100 divisions and to all corporate departments. The job requires creative management of rapidly growing systems development and operations staffs, with heavy emphasis on marketing and planning. Proven capability in managing both software development and centralized processing operations in a profit-oriented environment are a must. Master's degree preferred.

THE OPPORTUNITY:

If you have these qualifications and are interested in an exciting growth opportunity with excellent salary and benefits, send your resume and salary history in strict confidence to:

Barry Box,
Corporate Employment Manager
P.O. Box 269, Dept. CW-1
San Antonio, Texas 78291

HARTE-HANKS COMMUNICATIONS, INC.

We Are An Equal Opportunity Employer M/F

A FUTURE WITH THE FUTURE... PRC

PLANNING RESEARCH CORPORATION, a recognized industry leader in the dynamic world of computers, is now hiring professionals with the following hardware/software capabilities:

DEC MINIS • TANDEM • MODCOMP • IBM MACRO-II • TAL • FORTRAN • PL/1

PRC's opportunities reflect the leading edge of technology in digital communications, the latest in mini computer systems as well as future directed, large-scale data processing projects. As the world's largest diversified professional services organization, PRC is able to offer these challenging assignments in a variety of locations, some of which include:

HAWAII • WASHINGTON D.C. • BOSTON SOUTHERN CALIFORNIA • BELGIUM GERMANY • ENGLAND

Computer professionals with experience in Systems Architecture, Software Engineering & Design and Programming for scientific, intelligence, message processing, graphics and C^3 applications who are seeking a career move to a superb growth environment are invited to submit resumes to:

LAURA BOGGS
INFORMATION SCIENCES COMPANY
PLANNING RESEARCH CORPORATION
7600 Old Springhouse Rd.
Mclean, Virginia 22102
(703) 893-1800, ext. 2371
An equal opportunity employer M/F

Engineering Management

Director, Software Engineering

You would be associated with a dynamic communications systems manufacturer located in the Sunbelt, applying advanced hardware and software development in the communications technology.

In the position of Director, Software Engineering, you would have senior level management responsibilities for the direction of software development and support throughout an entire product line. Your 10 or more years of professional career background have given you a comprehensive knowledge of software related to communication issues, telecommunications technology, minicomputers, microprocessors, signal and image processors.

You also have the personal strengths and desire to apply proven organizational and motivational skills on a broad scale in a challenging atmosphere of rapidly advancing technology.

In this position you would be working with a leader in the industry, who has earned a reputation for fundamental breakthroughs, technical excellence and highly reliable products.

Benefit from an attractive total compensation plan including comprehensive benefits and relocation package. Start be sending your resume and current salary in complete confidence to:

Industrial Recruitment Associates Inc.
P.O. Box 81365 - Dept. 8778 • Cleveland, Ohio 44181
An Equal Opportunity Employer M/F - All Fees Company Paid

PROGRAMMING

Lead Systems Analyst/ Programmer
$27,780 - $33,540 Annually

The Office of the Chancellor of the California State University and Colleges has a new career opening with the Division of Information Systems, located on the California State University, Fresno campus.

The incumbent will assume responsibility for developing interfaces for major modules of a comprehensive student admissions and records system, Financial Aids, Curriculum and Business system. These systems utilize latest on-line and DBMS techniques, and are designed for application throughout the 19 campuses of the CSUC.

This is an opportunity to become part of a central systems development team, working with one of the most advanced and powerful data processing networks in the United States.

The incumbent must have at least three years of progressively responsible experience in analysis and programming on complex business/administrative systems. ANSI COBOL is required, On-Line and DBMS experience is preferred. Equivalent to graduation from a four year college. Final filing date: December 19, 1980. Please call (209) 487-1123 or send resume to:

James Morris,
Project Manager
Division of
Information Systems
California State
University, Fresno
Fresno, Calif. 93740
Equal Opportunity Employer M/F

UTILITY SUPPORT

Multi-faceted syst. prog. sought by nationally prominent firm to support IBM and in-house developed utilities. Min. 2 yrs. solid tech. exp. Pleasant New England area oppty. Salary to $26,000. (Fee Paid). Contact Pam Siegal.

Robert Half of Hartford, Inc.
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170
Personnel Consultants

JUSTICE INFORMATION SYSTEM COORDINATOR - Pinellas County, Florida (population 750,000; 290,000 tourists monthly) is seeking outstanding self-starter analytically oriented to coordinate operation of countywide justice information system for adult and juvenile offenders and coordinate new development and operation of related systems. Ability to communicate effectively with diversified users' group essential. LEAA grants development and administration background useful. Salary $22,000 to $27,000 depending upon qualifications. Excellent fringe benefits. Requires degree in mathematics, business administration, data processing, criminology or related area, and four (4) years experience in systems analysis, research or project direction, or equivalent combination of training and experience. Criminal Justice experience advantageous. Send four (4) resume copies before December 12, 1980 to:

DIRECTOR OF PERSONNEL
PINELLAS COUNTY UNIFIED
PERSONNEL SYSTEM
315 Court Street
Clearwater, Fla. 33516

PROGRAMMER/ ANALYST

Gather and Analyze information to develop new or modify present application systems. Designs, codes, and tests programs for computer operation. Minimum of Associate Degree. Prefer Bachelor's Degree in Data Processing but degree in other area with Data Processing experience acceptable. Minimum of two years of progressively responsible experience in analysis and programming in COBOL with business or educational applications. Experience may be substituted for advanced degree beyond AA and two years of experience on a year for year basis. Experience with DEC system is an asset.

Apply to Northeast Technical Community College, 601 East Benjamin Ave., Norfolk, NE 66701 or Phone (402) 371-2020 prior to December 5, 1980.

OVERSEAS POSITIONS

For Programmers
with IBM/370
Mark IV Experience
Contact Susan Scott
concerning this and
other possible positions.
1-600-446-9852
P.O. Box 8810
Richmond, VA 23225

AiDE

Operation Research Analyst

To direct specialist research and training development activities, introducing the newest behavior analysis techniques. To coordinate research activities in the behavior analysis area giving methodological advice and direction. Forty hours per week. $50,000 per year. BA/BS in Experimental Psychology. Two years training in behavior research in multi-national training environment. Two years experience in behavior analysis research. An essential requirement is practical experience of research. Behavior model building and training design in the following areas: Negotiation skills, managerial behavior, selling skills and counseling skills. **Contact Patrick Mahady-Operations Manager, 202/337-7799.**

Data Processing

DP DIRECTOR

Directs and administers operational/developmental activities for state CDP facility using data base and on-line systems. Supervises 110 personnel. Large IBM computer. Requires 8 years DP (3 of which are managerial). Salary negotiable. Submit resume to Administration, Capitol Building, Pierre, S.D. 57501.

S.D. Equal Employment Employer

Data Processing

Ohio Savings is just opening a new computer center in a conveniently located suburban community. This new installation offers dynamic career opportunities for an individual with hands-on experience and high ability as well as the desire to grow with an organization in the early stages. The installation will include IBM 370/4300, DOS/VS (future OS/VS or MVS), CICS, telecommunications, batch and interactive programming (BAL and COBOL). The installation is dedicated to state of the art approaches, technology and continuing education of staff.

Technical Support Specialist/ Systems Programmer

Reporting to the computer center manager. This position will be responsible for participating in hardware and internal software review and selection. Operating systems support; telecommunications support; data base generation and support. Telecommunications network and capacity planning; throughput optimization; software application package and new operational systems proposal reviews for compatability and capacity requirements; functioning as a consultant to systems development, programming and computer operations, education and training and supervision of staff.

We offer good benefits and free parking. For more information or to apply for this position, please send resume or letter about your background to C.H. Cooper, Ohio Savings Association, 1801 E. Ninth Street, Cleveland, Ohio 44114.

OHIO SAVINGS ASSOCIATION
1801 E. Ninth Street
Cleveland, Ohio 44114

An Equal Opportunity Employer M/F/H

WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY
DEPARTMENT OF COMPUTING AND QUANTITATIVE STUDIES

Senior Lecturer — Management Information Systems (Ref. 304A) (Permanent Appointment or Three Year Contract Available)

Taking a leading role for Management Information Systems teaching and research in undergraduate and postgraduate courses for students qualifying as Computer Professionals or in other business spheres. Applicants must have practical experience in Management Information Systems Analysis, design and application in manufacturing, other industries or commerce. Tertiary teaching experience an advantage.

Salary Range: Senior Lecturer &US27,754 — &US32,348: Lecturer &US20,685 — &US27,175 (Oct 29 Exchange Rate).

Conditions include: Fares for appointee and family plus some assistance with removal expenses. Superannuation is available for staff with permanent tenure. Return fares are provided for staff appointed for a limited term.

Applications: Details, including names and addresses of three referees should be submitted not later than 12th December to the Appointments Officer, Western Australian Institute of Technology, Hayman Road, South Bentley, Western Australia 6102. A brochure containing further information may be obtained by telex (AA 92983) or cable (waintech) citing "appointments", position number and your return Airmail address.

When applying please quote position reference number and Media Code CW4.

OLD DOMINION UNIVERSITY COMPUTER CENTER

ASSOCIATE DIRECTOR ADMINISTRATIVE SERVICES

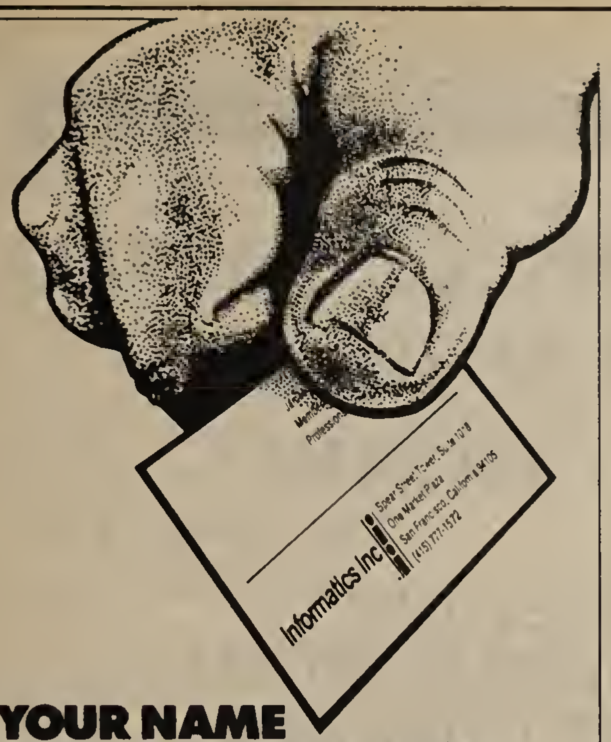
The Computer Center is seeking the right individual to be a key person in the major development of modern techniques in our Administrative Data Processing Systems.

This recently expanded position requires strong leadership abilities and an extensive background in Data-Base oriented project management.

Qualifications:	B.S. degree in MIS or related field and five years experience in administrative and business systems analysis and design. An M.S. degree and experience in a major university data processing environment is desirable. Extensive experience with development of Data Base applications preferred.
Responsibilities:	Provide institutional leadership for planning, development and implementation of administrative data processing systems. Supervise professional staff of programmers and analysts; assist in development of procurement specifications; represent Computer Center to University Administration; provide leadership and assistance to the Director in the overall management of the Computer Center.
Environment:	Old Dominion University is a public, doctoral degree granting institution serving 15,000 undergraduate and graduate students in the five major schools. The Computer Center currently operates a DEC System-10 computer system and supports all major aspects of computing services for the university. Current plans call for a major additional hardware acquisition in the near future in addition to complete renovation of administrative data processing systems.

Salary range $22,910 to $31,290 per year. To be given full consideration send resume and salary history, prior to December 23, 1980 to Employment Office Old Dominion University, Norfolk, VA 23508.

OLD DOMINION UNIVERSITY IS AN AFFIRMATIVE ACTION/
EQUAL OPPORTUNITY EMPLOYER



WHEN YOUR NAME IS ON THIS CARD, YOU HAVE A REPUTATION TO LIVE UP TO.

Are you qualified to become a Member of the Informatics Professional Staff? If you're a top performer in large IBM/OS environments with a background in COBOL, data base or on-line systems, you're definitely going in the right direction.

The Informatics team of consultants, analysts, and programmers has a reputation for high competence and productivity. We earned it by applying our skills and creativity to successfully solve a broad range of data processing problems for our clients.

Consider the satisfaction of high-level challenge at Informatics. Send your resume to Informatics Inc., Professional Services West, Suite 1018, Room 1280A, One Market Plaza, Spear Street Tower, San Francisco, CA 94105. We are an equal opportunity employer.

informatics inc

COMPUTER BUSINESS ANALYST/PROGRAMMER

Working for a Major International Organization in Washington can be challenging, rewarding and fun for the right people. If you:

- have five years of applications programming experience
- have an appropriate college degree
- enjoy problem solving in the information processing field
- know, or want to know more about data base
- like the sound of six weeks of annual leave
- feel comfortable in a multinational environment

Please send resume to:

Pan American Health Organization
Department of Personnel
525 Twenty-third Street, N.W.
Washington, D.C. 20037

MARVELOUS MARIN COUNTY, CALIFORNIA

The Frank Lloyd Wright County Civic Center in Marin County is not equipped with hot tub and peacock feathers, but it is a nice place to work. In addition to competitive salaries and excellent fringe benefits, we offer convenient free parking, flexible hours, a pleasant working environment and a variety of professional challenges in a small shop environment.

The Marin County Data Processing Department is expanding and is looking for a:

SYSTEMS PROGRAMMER - This requires two years of data processing experience involving disc operating systems, assembly language programming, and or data communications in addition to one year of programming experience.

If interested, please immediately call **Lew Willson at (415) 499-6104** or send your resume with minimum salary requirements to the **Marin County Personnel Office, Civic Center, San Rafael, CA 94903.**

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

COMPUTER SYSTEMS SUPERVISOR

. . . for Clinical Anatomical Pathology. MS or PhD preferred plus in-depth experience in computerized laboratory information systems. Responsibilities include participation in selection of system, installation involving interfacing with departmental operations and hospital information systems, development of new functions, and management of on-going system. Reports to Chairman of Pathology and Laboratory Medicine. Please send resume with salary requirements to Employment Manager

HOSPITAL OF THE
UNIVERSITY OF PENNSYLVANIA
3400 Spruce Street
Philadelphia, Pa. 19104
An Equal Opportunity Employer, M/F/H

APPLY YOURSELF

AT NATIONAL ADVANCED SYSTEMS.

At NAS, we're looking for talented computer professionals with the energy and initiative to fully utilize their technical expertise in advancing their careers. And, as a dynamic young company, we can provide just the right kind of environment for career advancement — one that encourages and rewards individual achievements.

So take the first step in proving your initiative. Apply yourself by calling Ursula Shepherd toll free at 800-227-1930, to discuss these immediate openings:

Systems Support Representatives

Consulting and providing technical support to field sales and marketing, you must be knowledgeable in the internals of IBM virtual operating systems (MVS, SVS, VS1, VM or DOS/VS). College degree or equivalent experience is required. The ability to write and present technical materials a plus. Openings nationwide.

Field Engineers

If you have the skills and ability to excel in field engineering, you'll be recognized for it at National Advanced Systems. We have openings nationwide requiring an AA in electronics or equivalent military experience. Our more advanced positions require experience on IBM 370/158 or larger CPUs or associated peripherals experience.

Field Support Representatives

Individuals experienced in problem solving with systems control programming are needed to resolve problems in customer systems software, assist field engineering with problem determination, and assist systems support representatives in running benchmarks.

If you can't call, send a letter of inquiry or a resume to Ursula at National Advanced Systems, 800 East Middlefield Road, Mountain View, CA 94043. We are an affirmative action/equal opportunity employer m/f/h.

National
Advanced Systems
A Subsidiary of National Semiconductor

Systems Engineering Manager

In support of O.E.M. Division Operations

A
TRULY
UNIQUE
OPPORTUNITY
WITH
NCR

Here is an opportunity to assume a highly visible managerial role in our worldwide OEM Systems Engineering organization. You will be joining our OEM Marketing Division, and will have broad responsibilities for helping us provide strong pre and post sale support to both marketing staff and OEM customers. You will have the resources of a $3 billion computer company behind you. Moreover, you will be in a position to significantly influence new product and market development strategy.

In addition to the satisfaction of further strengthening an expanding OEM Division, the position offers excellent prospects for continued professional growth. Your background should include 2-5 years of management experience, a degree in CS, EE or related discipline, and preferably an MBA as well. You must, moreover, have demonstrated ability to motivate others, and provide customers with competitive solutions.

We offer compensation commensurate with experience, and a superior benefits package. Please send resume, salary history and requirements to: **Brian Pitzer, Corporate Executive and Professional Recruitment, Dept. A50, NCR Corporation, World Headquarters, Dayton, Ohio 45479.**

NCR
Complete Computer Systems
An equal opportunity employer

Computer

SOFTWARE PROFESSIONALS

Megatek, a San Diego based corporation, is a leader in commercial high performance computer graphic systems. We are enjoying a dramatic growth rate of 50%-100% per year, and offer the following career opportunities;

COMMUNICATIONS PROGRAMMER

We are seeking a dynamic, self-motivating individual with interest in the communications aspect of new product development. This person should be very knowledgable in high speed synchronous protocols (SDLC, HDLC, BISYNC, SNA, X25) and should have significant experience in the implementation of these protocols at the device driver level. Position involves the strength/weakness evaluation of protocol designs. BS/MS in CS, with 5 years experience required, some experience with IBM Systems preferred.

SOFTWARE DEVELOPMENT PROGRAMMERS

Positions are available on several of Megatek's state-of-the-art software development teams. Previous experience with a range of graphics equipment and in graphics software system design necessary, as well as a BS/MS in CS.

Please submit your resume in confidence to C. Stowell

MEGATEK

MEGATEK CORPORATION

3931 Sorrento Valley Blvd.
San Diego, CA 92121
(714) 455-5590

Equal Opportunity Employer m/f/h

NORTH COAST OPPORTUNITIES
(Fully Paid Relocation)

MIS Director Set up new department, work on hardware selection, all new design.	**$35-45,000**
Project Manager (Leasing) Hardware upgrade, Develop new project team, corporate headquarters.	**$25-30,000**
Systems Programmer Work in telecommunications, new hardware, excellent benefits.	**$28-34,000**
Operations Research Manager Heavy forecasting, hardware evaluation and planning, corporate staff position.	**$28-36,000**
Project Leader Supervise seven, heavy user contact, key position.	**$25-32,000**
Real Time Systems Analyst Develop new industrial software, state of the art environment.	**$26-32,000**
Assembler Programmer Interactive network, all new development, financial application.	**$25-29,000**
Operations Manager Supervise all data center activities, training and personnel.	**$20-30,000**
Systems Programmer Install and maintain database, heavy user contact.	**$28-32,000**
Project Manager (Transportation) Develop own project team, heavy new development.	**$20-29,000**
Engineering Consultant Heavy system concept identification, prestigious firm.	**$30-35,000**

COMPUTER PERSONNEL

1148 Euclid Suite 210
Cleveland, Ohio 44115
or call Louise Falcone
216/781-5344

One of the Midwest's largest EDP Specialists

PRD ELECTRONICS DIVISION

IBM SYSTEMS PROGRAMMER

You'll Find Professional Success Here. . .at Harris/PRD

Challenge, excitement, potential for growth and meaningful responsibility are part of the Harris/PRD growth environment.

Currently we have a select opening for a talented individual with experience in BAL, COBOL, VM/CMS. Converting to MVS. Exposure to DB/DC systems helpful. Degree required.

We invite you to investigate the many unique benefits of this opportunity by submitting your resume to Mr. Harry Roberts, Employment Manager, Dept. BR, Harris Corporation, PRD Electronics Division, 6801 Jericho Turnpike, Syosset, N.Y. 11791.

HARRIS
COMMUNICATION AND INFORMATION PROCESSING

An Equal Opportunity Employer—Male and Female

COMPUTERWORLD CLASSIFIEDS WORK!

- POSITION ANNOUNCEMENTS
- BUY SELL SWAP
- SOFTWARE
- TIME & SERVICES
- SOFTWARE FOR SALE
- REAL ESTATE
- BUSINESS OPPORTUNITIES

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call Sue Stevens at 1-800-343-6474. She will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available): note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday,
10 days prior to issue date.

Rates: Open rate is $73.50 per column inch. Columns are 2″ wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $147 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

1 col x 4″	$294
2 cols x 4″	588
2 cols x 5″	735
2 cols x 8″	1,176

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available. $10 per insertion.
Ad Closing is every Friday, 6 working days prior to issue date (issues are dated Monday).

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700
New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (213) 450-7181
TELECOPIER SERVICE - (617) 879-0700

William J. Mills, Manager Classified Advertising

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

MARKETING MANAGER
COMPUTER FURNITURE & ENCLOSURES

We are seeking a highly motivated, results oriented marketing professional prepared for a rapid growth business environment. We are a national manufacturer of computer furniture and enclosures expanding the state-of-the-art in computer packaging to mini/micro O.E.M.'s systems houses, dealers/distributors and turnkey systems suppliers. The preferred candidate will have a proven record or accomplishment in O.E.M. marketing of C.P.U.'s, disk, tape or related peripheral. Experience in the improvement and expansion of a national rep and distribution network is required. This position is based in No. Hollywood and will report directly to the president working as a team member in a dynamic company environment. Please send resume and salary history in confidence to:

TRIMM INDUSTRIES
P.O. Box 6099
Santa Barbara, CA 93111

Faculty Position Computer Science
Birmingham-Southern College

Birmingham-Southern College, a liberal arts, four-year college, invites individuals with a Ph.D. or Master's Degree or equivalent professional experience, who are competent teachers to apply for a tenure-track position available September 1, 1981. Teaching assignments include both introductory and major courses. Program supported by HP-3000 system with excellent student access. Faculty rank, Assistant Professor; salary, competitive. Good fringe benefits program. Applications must include resume, three letters of recommendation, and both undergraduate and graduate transcripts. Send to Dean W. Edmund Moomew, Dean of the College, Birmingham-Southern College, Birmingham, Al 35254. Deadline for application is March 1, 1981.

Birmingham-Southern College is an equal opportunity/affirmative action employer.

MANAGER OF OPERATIONS - Supervises all data entry, control and computer operations in dual CPU environment with large teleprocessing network. Bachelor Degree in business administration, accounting of EDP and four (4) years computer operation experience, two of which should be supervisory. Candidate lacking degree may substitute eight years computer operation experience. **Salary Range $22,500 - $34,900 - Salary Commensurate With Qualifications. Contact by resume No Later Than December 10, 1980.** Send Resume To:

Unified Personnel System
Pinellas County Courthouse
Personnel Department
Director of Personnel
315 Court Street
Clearwater, Fla. 33516

COLORADO SPRINGS

Penrose Hospital, located at the base of Pikes Peak is looking for an Assistant Director of Data Processing. We are a two hospital system with 460 beds, and 1,900 employees.

If you have a BS and five or more years of program or project management experience, why not join Southern Colorado's finest hospital and enjoy our clean air and mild, dry climate. Major responsibility will be program management and daily operation in absence of Director.

Call: Roy Kiser (303)-630-5236
Mrs. Im Sun Stevenson
630-5237
Or Write:

Employment Office
Penrose Hospital
2215 N. Cascade Ave.
Colo. Springs, Colo. 80907

FLORIDA
All Expenses Paid

Our clients, in urgent need of your expertise will pay all your expenses in relocating you to an area of Sun & Fun, No State Tax, Average Temperature 75°.

PROGRAMMER ANALYSTS
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ANALYSTS

AVAILABILITY, INC.
813-872-2831
P.O. BOX 25434, DEPT. CW
TAMPA, FLORIDA 33823

SENIOR PROGRAMMER ANALYST
$1829 - 2233

PDP11/34 to PDP11/70, RSX11M, assembly language; local police facility requires dynamic self-starter to assume responsibility for maintaining and enhancing its on-line dispatch system. Communication experience helpful; B.A. degree, 3 years experience in computer programming, including one year in analyzing and designing EDP systems. **Apply by December 15, 1980, to the City of Stockton, Personnel Department, 425 North El Dorado, Stockton, CA 95202, (209) 944-8233.**

SR. PROGRAMMER ANALYST

An immediate opportunity exists for a Sr. Programmer Analyst to join our Information Services Department. Requirements include a B.S. or equivalent experience plus a minimum of 5 years of experience in a manufacturing environment. Candidate must be proficient in COBOL in a 370 environment with exposure to IDMS, on line systems, Panvalet, and Easytrieve being a plus. Responsibilities include the design of program logic to be written, specifications, preparation and thorough testing of programs, conducting data gathering interviews to interpret user requests and the preparation of program specifications to satisfy user requirements. Codman & Shurtleff, Inc. is an operating company of Johnson & Johnson and is dedicated to excellence and innovation in design, manufacture and marketing of surgical instruments and disposable products for the operating room. We offer a competitive salary and outstanding benefit package including major medical and dental plan. Please send your resume with salary history and current requirements to D.M. Gore, Selection & Placement,

Codman & Shurtleff, Inc.
Pacella Park Drive
Randolph, MA 02388
An Equal Opportunity Employer

IMS Programmer/ Analysts
$18 to $28K
San Francisco

Several of our Bay Area clients have immediate openings for IMS Programmer Analysts. Positions require a minimum of 2 years in Data Processing with 1 year in IMS COBOL applications. Prefer Manufacturing, Finance or Distribution Applications. Positions include relocation and excellent benefit packages. Salary commensurate with abilities.

We are consultants to management. Please call or send resumes in confidence to: Heather J. Headley, One Maritime Plaza - Suite 1350, San Francisco CA 94111, (415) 956-7120. Employer assumes fee.

professionals for computing, Inc.
Search & Personnel Services

PROGRAMMERS ANALYSTS

To $35K
All Fee Paid Positions

Our organization has many client companies needing experienced computer programming professionals - for banking applications, financial applications, scientific applications, real time, data base-IMS and systems engineers.

Contact M. D'Torre, 303/892-9110 or send career profile to

COMPUTER RESEARCH INSTITUTE
1209 S. Monaco Parkway
Denver, CO 80224

DATA CENTER

The New Jersey Department of Human Services has immediate openings for two (2) individuals to manage its Data Base Group and its Teleprocessing Groups at its Data Center in Mercerville, N.J. The Data Center operates a Honeywell 68/40 dual processor system with three (3) DCP 6624 network processors, approximately 350 terminals and utilities GCOS-4JS1, NPS, TDS and IDS-1. Planning is underway for migration to DM/IV.

DATA BASE MANAGER

Responsible for the design, installation, maintenance, and performance of all data bases. Will be responsible for the DM/IV migration period. Applicants must have strong technical experience in data base systems, with some exposure to supervision and management.

TELEPROCESSING MANAGER

Responsible for the planning, implementation, maintenance, control and performance of the data network, telecommunications, software and all support efforts. Wide exposure to high technology communications to include TDS, NPS, hardware and diagnostic tools is desirable.

These are permanent positions which offer salaries ranging from $24,082 to $32,510 based on experience and an excellent benefit package.

PLEASE REPLY IN COMPLETE
CONFIDENCE TO:
VERONICA MANGINE
PERSONNEL COORDINATOR

HUMAN SERVICES DATA CENTER
3525 Quakerbridge Road
Mercerville, N.J. 08619
Equal Opportunity Employer

BUSINESS OPPORTUNITY
EDP RECRUITING

Sophisticated, multi-state, very success oriented middle-management and professional recruiting organization, offers personalized, intensive training program plus continuous guidance. Major city franchises available.

Call: Hank Martin,
(212) 887-8252

VIP SYSTEMS
485 5th Ave.
New York City, NY 10017

VIP

CITY OF PHOENIX
POLICE COMPUTER APPLICATIONS PROGRAMMER II

$19,115-25,792 Annually

One year experience in programming mini digital computers. A Bachelor's degree in mathematics, computer science or related field is preferred. Any other combination of experience and education with the knowledge, skills and abilities required to perform the work may be subsituted. Must meet polygraph and background standards appropriate for nonsworn employees of the Police Department. Applications will be accepted on a continuous basis until a selection has been made. Apply:

CITY OF PHOENIX
Personnel Department
10 N. 3rd Avenue
Phoenix, AZ 85003
Equal Opportunity/Affirmative Action Employer

SUPERVISOR, SYSTEMS ANALYSIS AND DESIGN

Greenwich CT
$18,781-24,401

Excellent benefits. Supervises systems development and implementation activities. Designs, programs and maintains computer software. Considerable experience in computer programming and systems analysis. **Resume to Personnel Office, Town of Greenwich, Town Hall, Greenwich, CT 06830 by Dec. 10, 1980.**

ATLANTA/S.E.

CONSULTING (TECH SUPPORT) **TO $30,000+**

Major consulting firm has created a new & challenging positon. They seek an indiv. who will work closely with their DP clients evaluating Operating Systems as a "sounding board" in all technical aspects including performance measurement tools. Requires 5+ years IBM environment' strong bkgd. in Technical Support. Ideal position for Systems Programmer who wants out of lg. shop environment. Excellent growth. Indiv. will eventually build this function into a larger group.

DATA BASE MGR **TO $36,000+**

Major S.W. consumer products firm seeks "take charge" indiv. to assume complete resp. for their growing DB function. Responsibilities would include all day-to-day operations + high level planning in a Corp. Data Base environment, utilizing IMS with multi CPU's (3032 ++). Requires degree; 8+ years solid DB bkgd. (IMS), mgmt. track record a must. Excellent benefits and growth potential.

DP MGR **TO $26,000**

GA mfg. seeks "take charge" manager to be responsible for their sys. 34 shop. Duties include all planning. User interface and day to day operations. Excellent opportunity for indiv. who's now Sr. Analyst or backup to mgmt. Requires degree; Sys. 34 exp., mfg. including MAPICS. Excellent relocation pkg., low cost of living area.

SUPPORT **TO $25,000**

Major computer organization seeks indiv. to support clients in a Timesharing environment. Will develop customer proposals; and make presentations; modify/enhance system where needed. Requires degree, 4+ years DP bkgd. Prog. & design; Cobol exp. Atlanta Based, bonus & pkg. could equal $30,000.

Client companies pay all costs. For more information on the above positions, contact Ron Speng at 404/393-0933, or send resume in confidence including current salary to:

FOX-MORRIS
PERSONNEL CONSULTANTS
47 Perimeter Center E, N.E.
Atlanta, GA 30348

EDP OPPORTUNITIES

SYSTEMS Cnslnt Wall St. Plng & Design	$38K
PROJ Mgr networking/comm 11/70 Basic+	$45K
BUS Sys-MBA 10 yrs exp structured, data adm lge scale O.E.	$45K
S/A on-line realtime TANDEM fincl some travel	$30K
PROJ LDR - deg OS, COBOL, CICS	$35K+
ADABASE, D/S Anal 168/MVS TSO	$33K+
MGR Systems - OS, MVS, CICS	$38K
ASST MGR Tec Support - JCL ABENDS ROSCOE, lib	$33K
PLANN'G ANAL WALL ST. cage P&S Margin	$39K

NEW JERSEY

PROJ LDR - Deg order entry CICS	$32K
PROJ Mgr 3031, OS, VS 1, CICS	$35K+
SOFTWARE OS, VS1, CICS	$36K
SYSTEMS Cnslnt MSA G/L	$31K
EDP AUDITOR CARS - 3 or other order packages acceptable	$30K
SYSTEMS ANAL Detail design IDMS, MVS	$35K
P/A deg COBOL, IDMS	$28K
PROJ Ldr order entry CICS, MBA pfer	$35K
SR SOFTWARE SDS, CICS	$37K
SOFTWARE MVS degree	$33K
P/A, CICS, OS, VS 1	$29K
PROJ Ldr degree mfg fin sys design	$32K
BIZ Systems commodities, dist, fin	$38K

WESTCHESTER/CONN

S/A Prog PDP 1150/70, RSX11M Macro 2 Assembler	$40K
P/A, MVS, TSO, COBOL	$29K
S/A, Commodities, MVS 1, TOTAL CMS, COBOL	$39K+
PROJ Ldr DOS, VS, DL1	$35K
S/A 4300, IDMS, CICS, COBOL, OS	$40K
S/A, CICS, OS, Data dictionary	$37K
SR P/A-IBM 4300, IDMS, OS	$33K
P/A, OS, CICS, IBM 4300	$30K
PROJ Ldr CICS, OS, MBA	$35K

Call Bill Borrelli
(212)349-3810
WILLIAM HARRIS ASSOC.
150 Broadway, NY NY 10038 (Agency)

ROBERT HALF

DALLAS
SOFTWARE SPECIALISTS

We are currently filling key positions for several NYSE listed clients. All require IBM, OS or DOS systems background. Specifically, positions require one or more of the following: IMS, CICS, MVS, DOS/VS, DL-1 or assembler. To $32,000.

UNIVAC 1100

New and expanding Univac needs talented people to take a role in development of new systems. **Requires at least 2 yrs 1100/ECL, COBOL in a business** environment. To $24,000.

CONTACT: JOHN STAIGER
ROBERT HALF OF DALLAS, INC.
Two North Park East
Suite 750
Dallas, TX 75231
(214) 363-3300

SENIOR PROGRAMMER ANALYST

We are looking for strong, clear-thinking independent individuals. We have openings at sites in Detroit, Boston, Atlanta, Houston and Minneapolis areas. Urgent needs are in inventory and materials control, local and remote. For more details contact **John D. Elliott, Technical & Executive Division, 420 W. Parklane Towers, Dearborn, MI 48128 or call him at 313/593-3623.**

COSMO DATA SERVICES
Nationwide

Call us for information on opportunities in all areas of the country including Sunbelt. For a confidential telephone interview call

Toll Free 800/327-7260

or in Florida call 1/305/771-9910 collect.

Cosmo Data Services
5301 N. Dixie Hwy.
Ft. Lauderdale, FL 33334

All fees paid by clients.

ASSEMBLY LANGUAGE PROGRAMMERS
San Francisco Bay Area

Varian Instrument Group is a leading manufacturer of scientific instruments and data handling devices for chemical instrumentation. Our growing Walnut Creek division is conveniently located in the San Francisco East Bay area, just a few minutes from downtown San Francisco.

Our expanding software development department has immediate openings for Programmers to participate in the development of microprocessor-based products. Minimum 2 years assembly language programming experience on Z80 or 8080 CPU's. Prefer degree in computer science or related field with some chemistry Real Time operating systems experience desirable.

We offer excellent fringe benefits including 100% tuition refund for job related studies, health and dental insurance plans for employees and dependents. For confidential consideration please send your resume, including salary history and requirements to: Professional Employment, 2700 Mitchell Drive, Walnut Creek, CA 94598. An equal opportunity employer f/m/h/v

VARIAN
Instrument Group

DATA BASE ADMINISTRATION

Management position available which is responsible for established Data Base Administration Group, IMS db/dc environment, which provides heavy consulting in on-line application development and data base design, control of data definition through data dictionary, control of integrity of data bases, installation of data bases and associated programs. Minimum qualifications: five years experience in information systems including three years in application development or systems support using data base software and one year supervisory experience. Strong communication skills and Bachelor's Degree.

Liberal benefits include opportunity to continue education. Applications must be received by December 15, 1980. Send resume and salary history to:

UNIVERSITY OF ILLINOIS
Administrative Information
Systems Development
409 E. Chalmers, Room 213
Champaign, Illinois 61820

The University of Illinois is an Affirmative Action/Equal Opportunity employer and encourages applications from members of minority groups and women.

DIBOL PROGRAMMER

Development of a sophisticated import/wholesale distribution system in Miami, Florida needs an experienced programmer. To qualify you must have several solid years of Dibol experience and be thoroughly familiar with the RSTS operating system and the RMS11-K.

Business background is very helpful. Development package includes order entry, billing, purchasing, inventory control, accounts receivable and accounts payable. A job for a career minded programmer. Full benefits

For prompt confidential consideration send your resume and salary requirements to:

P.O. Box 520817,
Miami, Fla. 33152
Attn: DP Manager

UPSTATE NEW YORK

PROJECT MANAGER: Multi-project mgt. duties with consulting firm specializing in state-of-the-art MIS systems. Strong mgt. skills. $32,000 plus.

SYSTEMS ENGINEER: Develop real-time data base systems for telephone industry applications. PDP-11 UNIX operating system, C language. $25,000.

PROGRAMMER ANALYST: Mfg. applications including national service system. Cobol, CICS. $22,000.

BURNS PERSONNEL agency

600 Security Tower
Rochester, NY 14604

SYSTEMS MGR.

Full responsibility for planning, coordinating & implementing state-of-the-art Management Information Systems in financial & operational areas. Reqs. proven exp. in developing feasibility studies, systems design, project proposals & specs, & selection and implementation of equip. & software. Related degree, exp. with mini-computers, retail & financial exp. & strong supervisorial & commun. skills highly desirable.

This is a key staff position offering great visibility & professional respon. w/a $30M retail/service organ. in W. LA. Excl. comp. package. Pls. send resume & cover letter w/sal. req. to:

Dept. SA3
P.O. Box 60234
Los Angeles, CA 90060
An Affirmativa Action Employer

Teaching Position Available Commencing January 12, 1981:

Information Systems Management, B.S. degree program. Knowledge of 2 high level computar languages, master's degraa in appropriate area and significant practical experianca required. Experianca with Data Base Systems, Systems Analysis, Systems Managament and Operations helpful. Salary negotiable, position available pending budgatary approval. Apply to:

Professor Larry Scott
Buffalo Stata College
1300 Elmwood Ave.
Buffalo, N.Y. 14222

by Dec. 15, 1980.

Sacramento, CA

COMPUTER SYSTEMS SPECIALISTS

$25,100 - $30,500

The City of Sacramento naeds a Computer Systems Specialist who will be responsible for a UNIVAC 90/70 computar system using the VS-9 operating system. Tha system has ona meg of memory, 6 tapa drives, seven (200 meg) disk drives, card reader, punch and a multichannel communications controllar with 40 on-line terminals.

Requires degree in Computer Science or related field and 4 yrs. experience in computer programming, dasign and analysis. Additional experience may be substituted for education.

Excellent fringa banafits. City of Sacramento application and resume must be received by Decembar 26, 1980.

Raquast application from:
Sacramanto City Personnel
801-9th Street, Room 101
Sacramento, CA 95814
Tel. (916) 449-5726
EOE

Computer Programmers Needed
Two Positions Open

EDP Programmer, requires 1-3 years programming experience, salary $1342-1631 monthly.

EDP Programmer I, requires one year programming experience or AA, salary $1219-1481 monthly.

Excellent benefits.

Apply Saddleback Valley Unified School District, Personnel Office, 8 a.m.-4:30 p.m., M-F, 25631 Diseno Drive, Mission Viejo, CA 92691 by 4:30 p.m., Dec. 8, 1980.

EDP PROFESSIONALS
"Management Consulting"

Do you saek increased rasponsibility, challenges, and freedom; whera your input is highly regarded and your output rawarded accordingly? Then a carear to Partnership in a leading management consulting firm may be tha answar. Our client, located in N.J./N.Y. is saeking candidates with a provan track record of 3-10 yaars progressively responsible experience, demonstrated projact managament capability and strong problem solving and analytical skills in EDP business sytems, design, development and implementation. Exparience in consulting, manufacturing, EDP sarvice industry or retailing is desirable.

Compensation consists of an attractiva base salary plus bonus. Please send rasuma stating current compensation in strict confidence to:

Managing Partner
Deven Associates
60 Pompton Ave.
Verona, N.J. 07044

SALESPERSON

Major computer lessor has position available in NYC metro area for a qualified Salesperson with at least 3 years experience in marketing IBM 360 and 370 systems.

Excellent salary and company paid benefits.

Call or send resume to:

D. Moyer
212-532-1500
Tiger Computer
415 Madison Avenue
New York, N.Y. 10017

A TIGER INTERNATIONAL COMPANY

RPG II SYSTEM 34

Potential for significant growth with this industry leader. 2+ yrs RPG II programming and SYSTEM 34 exp. Aid in development of new COMMODITY system. Highly profassional anvironment with axcellant benefits. $28,000

DEC 11 BASIC

Rapid advancement opportunity for an up-and-coming computer pro. 2+ yrs BASIC PLUS or COBOL programming and RSTS-E exp. Company converting from IBM to DEC. Outstanding benafits include 30 days vacation. Career climbing opportunity. $27,000

LEARN CICS IMS

If you are in yesterday's environment this may ba the opportunity you have been looking for. Many opportunities exist in this highly STATE-OF-THE-ART OS environment to aid in development and implamentation of long term projects. 1+ yrs COBOL programming with good interpersonal skills. Outstanding benefits. $26,000

ALL FEES PAID
Call: MARTY AMATO

ROBERT HALF
OF NEW YORK, INC.

522 Fifth Avanue
New York, N.Y. 10036
212-221-6500 (agency)

Executive Director of Computer Services

Responsible for providing all central academic and administrative computing services in a 2 year suburban community college of 26,000+ students. Environment includes over 175 terminals and microcomputers plus IBM 4341, HP 3000, DEC 11/34, WANG 140 and use of several national natworks. Position reports to Computer Servicas Management Committee (President, Provost and Vica President), and provides coordination with Administrative Systems Users Advisory Committee and Academic Computing Users Advisory Committea. Bachelor's degrea or equivalent and 5 years of responsible experience in an intermediate or large systems environment at a college or a university is requirad. Salary range in $20-35,000 annually. Letters of application with a resume are being accepted by **John V. Blatnik, Director of Personnel, College of Duphee, 800 Lambert Rd., Glan Ellyn, Ill. 60137. 312/858-2800, ext. 2460 or 2461. Deadline for application: Jan. 15, 1981. Affirmative Action/Equal Opportunity Employer, M/F.**

SYSTEMS ADMINISTRATOR

World Vision, an evangelical humanitarian organization, needs a Systems Administrator to lead a small technical support staff responsible for systam software installation and maintenance, and application softwara installation. Requires 5 yrs exp as system analyst, prefer min of 1 yr exp with DEC-SYSTEM-10 or -20.

Send resume to John Minor, World Vision, 919 W. Huntington Dr., Monrovia, CA 91016.

EOE-M/F

UNIVERSITY OF NEVADA SYSTEM
ASSISTANT DIRECTOR - ACADEMIC/RESEARCH USES

The University of Nevada System Computing Center (serving several divisions) is looking for an Assistant Director to head its Academic/Research Uses group.

The Assistant Director plays a vital role in coordinating academic and rasaarch activities throughout the system as well as directing the group supplying such sarvicas as program consulting, documantation, rasearch and library support on Control Data Cyber equipment.

A Doctoral degree in computer science or related field is desired. Strong preference will be given applicants with teaching axparience. A mastars degrea with 5 yaars experience is a minimum considaration.

Tha position is a tanure track position with genaral University banefits. The applicant may choose Las Vegas or Reno as the location. The salary range is $27,500 to $38,000 depending on qualifications.

Plaase send rasume and names of three refarences by January 15, 1981 to:

Glen H. Clark
Chairman Search Committee
UNS Computing Center
P.O. Box 9068
Reno, Navada 89507

The University of Navada is an equal opportunity employer.

DATA BASE MGMT.

Excel. chance to make important contribution to successful team. IMS exp. req'd. Min. 4 yrs. with ability to interact successfully with corp. level mgmt. Large scale IBM Conn. based firm. Salary to $31,000. (Fee Paid.) Contact Pam Siegal.

Robert Half of Hartford, Inc.
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170
Personnel Consultants

Computer Maintenance
Southern California

USC/ISI has openings in tha IN-HOUSE COMPUTER SERVICE GROUP. This group maintains several larga scala timasharing computer systems as wall as a numbar of special purposa minis. All systams ara located within ona building in baautiful Marina Del Ray. No travel involvad.

If you have 3 or mora years axperlanca in ona of tha following araas, you may ba a candidate for one of thesa positions.

DEC Systems:
KA10, KI10, KL10, KL20, PDP 11/40, 11/45, 11/70, VAX 11/780
CALCOMP:
1035/235 disk systam, 1040/347 tape system
Storage Taxt:
3800/3470 tape system
Ampex:
ARM10 memory

If you ara interested in axploring these opportunities further plaase call 213/822-1511, ext 172 or send your rasuma in complete confidance to:

Univarsity of Southarn California
Information Sciences Instituta
4676 Admiralty Way
Marina Del Ray, CA 90291
Attn: Dick Fiddhar
EOE

DEEP SOUTH

Sr. Systems Analyst. Enjoy gracious living in the deep south in medium size city. International chemical co. has IBM/3031. User interface experience on-line with understanding of Data Base Concepts. Sal. to $31,000.

TENNESSEE

Programmer Analyst. Mfg. co. in growth situation is going from IBM/34 to IBM/38. RPGII necessary with mfg. applications a plus factor. Co. is 30 minutes from beautiful Nat'l. Park with tremendous outdoor recreation, huge lake area. Economical small town living. Sal. to $24,000.

GULF COAST

Systems Analyst. Spend weekends fishing Gulf of Mexico. Enjoy Old World splendor of New Orleans. Live and work in small town atmosphere less than hours drive from coast. Planning experience on Univac 1100 series. Sal. to $36,000

OKLAHOMA

Programmer Analyst. Enjoy culture, entertainment, and convenience of city living. Oil and gas co. is adding IBM/4331 on-line to IBM 370. Will be upgrading to a Group II. Minimum two years COBOL/DOS/VS/CICS. Sal. to $22,000.

Client Companies Pay Fees.
Your reply 100% confidential.

For more information on these openings and others Nationwide, call or mail resume to Bob Rees, Corporate Recruiter/EDP.

Lee Whipple
Personnel Service
4745 Poplar, Suite 205,
Memphis, TN 38117
(901) 767-0310

We're looking for writers who understand EDP

(and who would like to be part of one of America's most respected and successful business publications.)

Computerworld has several openings on its editorial staff for people with good editing/writing skills and a knowledge of the world we cover every week:

Senior Editor

You will need to be able to spot trends, interact with industry executives and managers of the nation's largest data processing departments, produce good, well-researched news and feature stories and supervise staff writers — all under the pressure of our weekly deadlines.

To qualify you should have at least three years of experience in one or more of the following areas: writing, journalism, data processing, editing or newspaper management. You need not have direct newspaper experience if you have demonstrable writing/editing skills and a good working knowledge of EDP.

Staff Writer

An entry level writing position. You will write news and product stories, participate in team projects and surveys all under supervision.

To qualify, you should have some writing experience and exposure to data processing/computing, but all experienced writers will be considered.

We offer a good location just outside of Boston, excellent benefits, including profit sharing, and the chance to join a small but successful and fast-growing publishing organization.

To apply please send your resume to:
Nancy French, Managing Editor
Computerworld
375 Cochituate Rd.
Framingham, MA 01701

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

We are an equal opportunity employer

CMG XI International Conference on

COMPUTER PERFORMANCE EVALUATION IN THE '80s

December 2-5, 1980
Sheraton-Boston Hotel • Boston, Mass.

AWARDS
A. A. MICHELSON AWARD
THREE BEST TECHNICAL PAPERS

REGISTRATION FEE:

At Conference	**$175**

At Conference $175.00*
1 Day Attendee $ 75.00
*Includes 1 year membership

TECHNICAL SESSIONS BOF SESSIONS
TUTORIALS VENDOR EXHIBITS
VENDOR PROGRAM
PERFORMANCE MANAGEMENT SESSIONS

LUNCHEON SPEAKER:
Dr. Michael Hammer
MIT

KEYNOTE SPEAKER:
Seymour Kraut
Field Engineering Division
Honeywell, Inc.

DON'T READ THIS...

Unless you are considering making a meaningful career change. We are nationwide specialists in EDP placements. Your success is our business. Current openings include:

- **CAD/CAM Engineers, $20-50,000**
- **Systems Manager, petrochemical $36,000**
- **Systems Programmers, $22-30,000**
- **Banking Applications-ATM-$18-30,000**
- **Bus. & Mfg. Programmers, IMS, CICS, $22-30,000**
- **Mini-computer Programmers, $18-24,000**
- **Microprocessor Engineers, $25-30,000**

All positions fee paid by clients. All inquiries strictly confidential. Contact:
Jim Crumpley, Manager
Dorsey Love & Associates
P.O. Box 4387 G.S.
Springfield, MO 65804
(417) 883-1212

Dorsey Love
& Associates, Inc.

Get off the routing list and on to the subscriber list.

To subscribe, you can use your American Express, Visa or Mastercharge card and call, toll free,

800-343-6474

(in Massachusetts, call 617-879-0700).

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

BUY SELL SWAP

SALE/LEASE

** 4341 K **

Available: 12-20-80
DANVILLE FINANCIAL LEASING
47 Quail Court, Suite 202
Walnut Creek, California 94596
(415) 932-5511
Loren E. Campbell Fred E. Hegeman

DEC PDP11/34A (D358 System)

For Sale By Owner

256K	bytes memory
3	RK07 disk drives
1	LP05 line printer
1	Printronix printer (300 LPM)
4	VT-100 CRT's
1	VT-52 CRT

All equipment under DEC maintenance and less than 18 months old.
Call M. Jaffe at (312) 644-5818.

FOR SALE: IBM 360/20

Consisting of:
2560 MFCM
2203 Printer
2-2311 Disc Drive
029 Key Punch
129 Key Punch
All storage files and programs for Manufacturing Co.
Call:
David Halpert
516-694-1000

FOR SALE TWO 8392-H DATA GENERAL NOVA 4S

64KB
5 SLOT CHASSIS
$5700 EACH
Jeff Van Cott
607/369-9341

4341-K

Available
12-10-80
Thomas Nationwide Computer Corporation
516-752-1000

For Sale IBM System 32

Excellent Condition
5320 B34 Processor
12.7 MB Disk
155 LPM Printer
For more information, contact:
Mr. Robert Larson.
Greenberg Bros., Inc.
Elk Grove Village, IL
Phone: 312/595-8990

DEC

FOR SALE - NEW
(6) DEC PDP 11/03-LK CPU's with 64KB MOS and KEV.
Available Immediately.
Call:
Ken Moskowitz
Advanced
Computer Techniques
17th floor, 437 Madison Ave.
New York, N.Y. 10022
212/421-4688

THIS SPACE FOR HIRE.

WANTED

FOR
IBM System/3 Model 12

Machine Type	Feature
5412	Model change B16 to C20
5412	3500
5412	4701
5412	4702
5412	4705
5412	5732
5412	4704

Must be IBM Maintenance Approved
Bert Rodgers Schools of Real Estate
1-(305)-855-5441

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

AVAILABLE

138's
148's

RANDOLPH
Computer Company
Division of The Bank of Boston
537 Steamboat Road
Greenwich, Ct. 06830
800-243-5307
(In Connecticut, 661-4200)

Member
Computer Lessors Association

4341

December 1980 Ship

Call 617-437-1100
AMERICAN COMPUTER GROUP, INC.
P.O.BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215

Series/1

Short Term Leases

BUY • SELL • LEASE

COMPUTER OPTIONS, INC.
The Best Option
in IBM Computers

Parkdale Plaza Bldg. #540W
1660 So. Highway 100
Minneapolis, MN 55416

612 • 544 • 8660
800 • 328 • 5718

SYSTEM 3-32-34-38

SERIES 1-5110

WANT TO BUY ANY SYSTEM 34

Available: S34-E35-E34-C23-C24-D35
5251-11, 5251-12, 5256-03

Communication: 3271, 3272, 3277, 3284
3284, 3286, 3288, 3776
3777, 3780, 3704, 3705

Peripherals: 3741, 3742, 129, 029, 059
3715, 3717, 083, 514, 548
3410, 3411, 3340, 3344

GENE NICHOLL TOM KLEEFISCH

AMERITEX COMPUTER CORP.
14229 Proton Road
Dallas, Texas 75234
214/934-9151

IDS international data services, inc.

DEC SYSTEMS

PDP 11/70's,
11/34's, 11/04's,
11/03's & Peripherals

BUY & SELL

(408) 738-3368
telex 345 592

1020 Stewart Drive
Sunnyvale, CA 94086

Buy • Sell • Lease

3 32 34 38

All IBM Peripherals

CALL COLLECT! 901/372-2622
COMPUTER BROKERS, INC.
2978 Shelby St. • Memphis, Tennessee 38134

BUY • SELL • LEASE

370/115
370/125
370/135
370/138
Call Ken Bouldin

370/145
370/148
Call Nelson Johnson

S/3
MODEL 8
MODEL 10
MODEL 12
MODEL 15
3742
S/32
S/34
Call Gayle Drotar
Roger Odom
Jack Goodman
IBM Maintenance Guaranteed

TAPE
3411·3410
3420
DISK
3340·3344
3350
Call Bob Ford
or Nelson Johnson

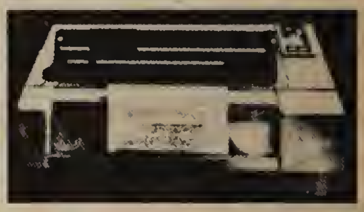
Want our capabilities brochure? Send us your business card.

ECONOCOM
1755 Lynnfield Road
P.O. Box 17825
Memphis, Tennessee 38117
901-767-9130
Member CDA

أسكرايب **ARABIC** سكربتو - برنت

COMPUTER SYSTEMS AND PERIPHERALS

PDP 11's **VAX** **DECSYSTEMS20**



The Ascribe VDU and Scripto-Print are a matching English/Arabic set. We can supply, install and maintain total systems in the Middle East through our Extensive Support Organization.

International Interfaces & Systems, Inc.
9946 Main Street/Fairfax Square
Fairfax, Virginia 22031
Phone (703) 691-1114
Telex 901123 IIS FRAX

We· buy· sell· and lease· Computer Systems

Available for
Immediate delivery!

• CPU's • CRT's • PRINTERS •
• ALL MODELS •

PURCHASE / LEASEBACK
SHORT & LONG TERM LEASES

• WE WANT TO BUY •
• OWNED
OR RENTAL CREDIT •
• IMMEDIATE CASH •

• ALL MODELS
• PRINTERS (3715 and 3717).
• AVAILABLE IMMEDIATELY
• MANY IN STOCK

We buy & sell
CALL • STEVE HOUGH
• DICK GEYER

Pearl EQUIPMENT CO., INC.

PEARL EQUIPMENT COMPANY, INC.
P.O BOX 24026 • 4717 CENTENNIAL BLVD. • (615) 383-8703 • NASHVILLE, TN 37202

3270's

AVAILABLE FOR SALE OR LEASE

3271/3272 CONTROLLERS
3277 DISPLAY STATIONS
3284/3286/3288 PRINTERS

3274 CONTROLLERS
3278 DISPLAY STATIONS
3287/3289 PRINTERS

NF COMPUTER
SALES & LEASING CORP.
1211 W.22nd St., Suite 424, Oak Brook, Il. 60521
Telephone 312-920-8181, Telex 206106 NFC OAKR

O.P.M. LEASING SERVICES, INC.

The Custom Leasing People

Branch Offices

ATLANTA	(404) 953-0926
BOSTON	(617) 749-4844
CHICAGO	(312) 945-8150
DALLAS	(214) 641-7870
DENVER	(303) 499-4488
DETROIT	(313) 996-5811
HOUSTON	(713) 367-1668
KANSAS CITY	(816) 474-8106
LOS ANGELES	(213) 278-4117
MINNEAPOLIS	(612) 884-9980
NEW JERSEY	(201) 635-1092
N.Y. FINANCIAL DISTRICT	(212) 747-0220
ST. LOUIS	(314) 434-6330
SAN FRANCISCO	(415) 383-4111
WASHINGTON, D.C.	(202) 656-8676
International Offices	
LONDON	01-222-4031
PARIS	331-775-0511
COLOGNE, GERMANY	221-763-1458

OPM

Corporate Headquarters
O.P.M. LEASING SERVICES, INC.
71 BROADWAY, NEW YORK, N.Y. 10006
(212) 747-0220
TWX: 710-581-5223 OPM LEASE/NYK

Short and Long Term Lease Plans Available

CPUs

370/135
370/145
370/155
370/165
All Configurations Available For Sale or Lease

303X Series
Purchase/Leaseback of Installed or OPM Supplied

370/158
370/168
All Configurations Available For Sale or Lease

4300 Series
All Configurations Available for Sale or Lease
"Subject to edherence to IBM's order certificetion process"

370/138
370/148
All Configurations Available For Sale or Lease

Amdahl All Models
CDC Cyber 74
Univac 1100 Series
All Configurations Available For Sale or Lease

FEATURES/MEMORY

370/158 & 168
ISC/Madrids
All Channels
For Sale or Lease

IBM Memory:
370/158s, 168s, etc. or 3000 Series Machines
For Sale or Lease

OEM Memory:
155s, 158s, 168s, either EM&M, NSC, Intel or STC
For Sale or Lease

PERIPHERALS

3333/3330s
3350s
3830s
All Configurations Available For Sale or Lease

3803 Controllers
3420 Tapes
All Models and Configurations Available For Sale or Lease

3211/3811
1403/2821
All Configurations Available For Sale or Lease

Complete Installation and Planning Support Provided

DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC

DEC

Specialists in DEC Systems and DEC Compatible Add-Ons

MK11CA	**14K**	**DH11AD**	
MK11CE	**7K**	**32 Lines**	**10K**
MS780DA	**2.7K**	**48 Lines**	**15K**
MS780BD	**5.2K**	**64 Lines**	**20K**
MS780DC	**10K**	**LP11VA**	**7K**
MS780DD	**19K**	**LP11YA**	**10K**
MS11LB	**2K**	**LP11CA**	**15K**
MS11LD	**3K**	**TJU45**	**8K**
		TJU77	**14K**
		TJU125	**16K**

DATA SYSTEMS SERVICES

Buy-Sell-Lease

23901 Remme Ridge Rd.
El Toro, CA 92630
(714) 770-8024

DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC DEC

IBM PERIPHERALS

SALE OR LEASE

DASD	3310 3344	3330 3350	3340 3370
TAPE UNITS	3420	3410 ALL MODELS	8809
PRINTERS	1403	3203 3287	3211 3289
CONTROLLERS	3803 3880 3274	3811 2821 3272	3830 3276 3271
CARD I/O	3505	3525 2501	2540 1442
DISPLAY STATIONS	3278		3277
MICR	1419 SINGLE/DUAL ADDRESS		

MOST ITEMS AVAILABLE FOR IMMEDIATE DELIVERY

Contact:
Bernie Gest

215-782-1010

Computer Marketing Inc.
7704 Seminole Avenue
Phila., Pa. 19126

• DATA GENERAL •
• DEC •
SURPLUS SPECIALS

DATA GENERAL		DEC
NOVA· 4/X NOVA 3/D NOVA 1200 NOVA 2/10 ECLIPSE· S/230 ECLIPSE C/330	CPU'S	PDP 8 11/03 11/04 11/05 11/34A 11/45
NOVA ECLIPSE	MEMORY	MM8EJ MM8AB MM11DP MS11JP MS11LB MS11LD
6070-N 20 MEG SUBSYSTEM 6045 10 MEG DRIVES 6030 DUAL FLOPPIES 6060-A 96 MEG	DISKS	RX8BA RK05 RK8E RL01 RP02 RP03 RP04 RP06 RM02 RM03
6026 800/1600 BPI 6026-A SLAVE UNIT	[illegible]	TM811MA TM811EA
4251 COMMUNICATIONS CHASSIS 4264 SYNC. LINE MUX 4250 DCU 50 4256 ALM 4	COMMUNICATIONS	DZ11 DH11
6053 CRT'S, D-100 6012 CRT'S, D-200	[illegible]	VT52 LA180 VT100 LA36

BUYING OR SELLING, CALL:
• DEC - Bryan Eustace 305-272-2338
• DATA GENERAL - Phil Thomas 305-272-2339

Thomas Business Systems, Inc.

DEC
COMPUTERS

11/34A's w/RSTS/E
and
proven software
packages (optional)

**Components
(new & used)**

VT100's, DZ11B,
RL01 drives and
cartridges, LA120,
DL11/s, H960 Cab,
ADM 3A's, Tel Video's

**Command
Data Inc.
205/942-3156**

Buy/Sell/Lease

3350	●	3830
3340	●	3344
3333	●	3330
3420	●	3803

Call Scott Hughes,
Jon Polonez or
Annette Rosen

**3031 ● 158
4341**

Call Stu Lieberman

**3033 ● 3032
168**

Call Ted Molinari

Dealers — Call
Barbara Bryant

**IPS Computer
Marketing Corp.
Mack Centre II
Paramus, New Jersey 07652
Telephone: (201) 262-9500
Member CDLA**

COMDISCO®

**Your First Choice ☑
In The Second Market**

IBM PROCESSORS

☐ 3033 Will Buy/Lease/Finance
☐ 3032 Systems Available 4th Qtr.
☐ 3031 24-36 Month Leases
☐ 3168 Systems Available Now
☐ 3165 Good Price Performance
☐ 3158 All sizes — Short Term
☐ 3155 One Year Leases
☐ 4341 Systems Available 4th Qtr.
☐ 3148 12-24 Month Leases
☐ 3145 Month-to-Month
☐ 3138 Month-to-Month
☐ 3135 Month-to-Month

MISCELLANEOUS

☐ Channels/Memory — Call Rosemary Geisler 312/698-3000
☐ 3704/05 — Call Karen Johns 312/698-3000
☐ 327X — Call John Christopher 312/698-3000

IBM PERIPHERALS

☐ 3880 Immediate Availability
☐ 3370 For Sale
☐ 3350 Will Buy/Sell/Lease
☐ 3420 All Models Available
☐ 3330 15-Day Delivery
☐ 3340/44 For Sale/Lease

We Can Put It Together

Branch Offices:

Atlanta	404-256-5956
Chicago	312-698-3000
Connecticut	203-853-6966
Dallas	214-258-6444
Ft. Worth	817-534-1774
Michigan	313-644-1500
New Jersey	201-568-9666
San Francisco	415-944-1111
Washington D.C.	301-441-1000
Latin America	305-266-5682
Toronto	416-498-7220
Paris	297-2000
Switzerland	021-71-09-35
West Germany	(2434) 3948
Toll Free Number	**800-323-2144**

Corporate Headquarters
Comdisco, Inc.
6400 Shafer Court 312/698-3000
Rosemont, IL 60018 TWX — 910-253-1233

MEMBER CDA/CLA

FOR SALE
By Owner
IBM
System 34-E35

128K 128 Meg
1-3262 Printer
13-5251 Mod 11 CRTs'
1-5251 Mod 12 CRT
2-5256 MOD 3
Matrix Printers
1-5256 Mod 1
Matrix Printer
Under Current
IBM Maintenance Contract

**Available
February 1, 1981**

**Anodizing, Inc.
(503) 285-0404
Tom Lenz or
Jerry Albright**

DEC EQUIPMENT IN STOCK

- SM 70 CVA-LN 50 cycle 11/70 with DZ11-E, (2) VT 100-NB's with PRC central software.
- 11/34A-XE CPU in H9642 cabinet
- MS11-LB's
- MJ11-BE's
- VT100's — 50 & 60 cycle
- RK07K-EF error free disk pack

**PRC
3 Perimeter Rd.
Manchester, N.H., U.S. 03103
603/625-4750**

For Sale By Owner

IBM 370/145

Available Jan. 1981

3145-I02	512K processor
3047-1	Power Unit
3215-1	Console Printer Keyboard
3830-2	Storage Control

**Call Jay Neff
305/420-5551
Sentinel Star Co.
Orlando, FL**

DEC®

OR EQUIVALENT

HAVE IT YOUR WAY
BUY-SELL-LEASE

Check these savings on equivalents

OUR PART #	DEC PART #	DESCRIPTION	DEC LIST	OUR LIST
WJM02	RJM02	80 MB DISK AND CONTROLLER	25700	15500
WWM03	RWM03	80 MB DISK AND CONTROLLER	26800	17500
WM02/03	RM02/03	80 MB DISK (SLAVE)	19300	8500
WJP06	RWP06	200 MB DISK AND CONTROLLER	44000	21500
WWP06	RWP06	200 MB DISK AND CONTROLLER	44000	23500
WP06	RP06	200 MB DISK (SLAVE)	34000	14995
WJM04	RJM04	300 MB DISK AND CONTROLLER	N/A	23500
WWM05	RWM05	300 MB DISK AND CONTROLLER	N/A	25500
WM04-05	RM04-05	300 MB DISK (SLAVE)	N/A	16500
WTJ45	TJE16	45 IPS TAPE AND CONTROLLER	20200	8100
WTJ75	TJU45	75 IPS TAPE AND CONTROLLER	24600	10000
WTJ125	TJU77	125 IPS TAPE AND CONTROLLER	30000	11990
WH960	H960	CABINET FOR TAPE DRIVES	1800	1500
WMS11-LB	MS11-LB	128KB MOS MEMORY	4300	2100
WMS11-LD	MS11-LD	256KB MOS MEMORY	6400	4250
WDD11-CK	DD11-CK	FOUR SLOT BACKPLANE	440	350
WDD11-DK	DD11-DK	NINE SLOT BACKPLANE	880	750
WDD11-PK	DD11-PK	NINE SLOT PROC. BACKPLANE	880	750
WM9312	M9312	BOOT/DIAGNOSTIC/TERMINATOR	880	750
WM9302	M9302	UNIBUS TERMINATOR	110	100
WDL11-W	DL11-W	SERIAL INTERFACE	820	700
WLP11	LP11	LINE PRINTER CONTROLLER	770	650

COMMISSIONS PAID ON SALES

(408) 732-4523

WEX
West Coast
Computer
Exchange Inc.
248 Sobrante Way, Sunnyvale, CA 94086

DATALEASE R

DEC

BUY-SELL-LEASE
• SYSTEMS • PERIPHERALS
• TERMINALS
• MEMORY • DISKS

**DEC EQUIPMENT
NEW & USED**

**• VAX • 11/70
• 11/34 • 11/23**

**IMMEDIATE DELIVERY
800-854-0350**
(CALIF. 714-632-6986)

DATALEASE R
2770 E. REGAL PARK DRIVE
ANAHEIM, CA 92806
TELEX 692439

The DEC Specialists©

EQUIPMENT AVAILABLE

Description	For Sale/ Lease	Date
370/168		
168-L	lease only	11/30/80
2860-3	lease only	now
370/158		
158-U32 (ISC and Madrids)	lease only	now
158 Memory-1 meg (CDC)	sale or lease	now
3058 for 158	sale or lease	now
1435, 1850, 2150, 6111, 7730, 7840, 3213	sale or lease	now
370/145		
145-I (6982, 7855, 3345, 3046, 8810, 3215)	sale or lease	12/09/80
6983, 6984	sale or lease	now
370/135		
135-FEO (4670, 4672, 7855)	sale or lease	10/28/80
Memorex Memory	sale or lease	10/28/80
370/125		
125-H00	sale or lease	10/01/80
Other		
2835-2	sale	10/17/80
2305-2		

CONTACT:

LFC
**Jack A. Northrop
Lease Financing Corporation
3 Radnor Corporate Center
100 Matsonford Road
Radnor, Pa. 19087
215/527-4450**

DIEBOLD
COMPUTER LEASING
BUY•SELL•LEASE

ALL CPU's & PERIPHERALS

360
370
303X
4300 Series

IBM
CARD READERS & PUNCHES
PRINTERS
CONTROLLERS
AVAILABLE NOW

CALL **DIEBOLD**
800-631-1602
201-569-3838
TWX 710-991-9733

177 North Dean Street, Englewood, New Jersey 07631
Member: Computer Lessors Association
and Computer Dealers Association

BUY SELL LEASE

370 PERIPHERALS
Disk Printers
Tape I/O

370 CPU's
135/145/155
138/148/158

GSD
Sys. 32/34/38
All Sys. 3

DATA ENTRY
37XX/5496
All 3200

UNIT RECORD
029/129
083/557

DAC Buys Rental Credit Equipment
Call or Write

DATA AUTOMATION CO, INC.
4858 Cash Road
Dallas, Texas 75247
214 637-6570
TWX-910-861-4240
Member of Computer Dealer Association

Available Now
11/44
System
- 2 RK07s
- QDMS
  Data Management

M.E. Congdon (203) 728-6777
Quodata®

Computer-world's classifieds work.

[That's why you see so many of them.]

IBM Unit Record Equipment
Disk Packs and Data Modules

Mach	Sale	Lease	Mach	Sale	Lease	Pack	Sale	Lease
026	$ 750	$35/mo	088	$2750	$125/mo	1316	$ 39	—
029	Call	$45/mo	129	Call	$110/mo	2316	$ 99	—
082	$ 750	$35/mo	548	$1500	$ 60/mo	3338-1	$129	$12/mo
083	$1875	$60/mo	557	$3500	$125/mo	3336-11	$299	$19/mo
084	$2750	$125/mo	3742	$3475	$175/mo	3348-70	$695	$39/mo
085	$1200	$60/mo	360/20		Offers	Cartridge	$ 39	—

Other machines, packs, also available.

Thomas Computer Corporation
600 North McClurg Court, Chicago, IL 60611 (312) 944-1401

---

dataserv
Your Authority in the IBM Second Market

IBM equipment is too valuable to be used only once. When you need to know Second Market equipment values, market conditions and definitive answers to other questions, turn to Dataserv. People who know Dataserv trust Dataserv for good advice about the Second Market. Dataserv can help you get maximum satisfaction with your Second Market transaction, if we haven't listed the equipment you want to buy, sell or lease call our toll-free numbers, we cover the entire IBM Second Market.

GSD SYSTEMS

SYS 3
Short Term
Lease Avail.

SYS 32
Sale or Lease
All models

SYS 34
All models
New or Used

SYS 38
Over 50
Del. Pos. Avail.

DPD SYSTEMS

125	138	4331	3031
135	148		3032
145	158	4341	
155	168		3033

Memory available for all IBM Processors

PERIPHERALS

3330	3410	3203	1403
3340	3411	3505	1442
3350	3420	3525	2501

All peripherals available on short or long term lease

1255
All models
Sale or Lease

1419
On Line or Off Line
Lease/Sale

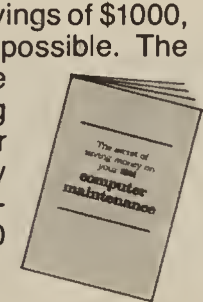
3880
Avail. now
Flexible Terms

"Overview" keeps you posted on the IBM Second Market

Overview is a bi-monthly newsletter published by Dataserv. It deals exclusively with information and market knowledge that will help you be better informed about the Second Market for IBM equipment. Price Trend Charts give you an invaluable guide to equipment values for budgeting and planning. Articles are written to help you deal more effectively with vendors. If you wish to receive Overview on a regular basis, free-of-charge, send your request (on your letterhead, please) to Dataserv at the address listed below.

Dataserv can save you money on your IBM maintenance.

If you are using IBM or 370 computers here's good news: now you can have genuine IBM maintenance at a saving. Yes, it's true, you can save on your maintenance budget without sacrificing quality. Dataserv Computer Maintenance, Inc. (DCMI) service is identical to IBM (because it is IBM) in every respect except what you pay. DCMI maintenance is performed by IBM service engineers using genuine IBM parts. Depending upon your system configuration, annual savings of $1000, $5,000, $8,000 and more are possible. The facts are yours in our free 8 page booklet "The Secret of Saving Money on Your IBM Computer Maintenance." Call or write today for your free copy. For prompt response call our toll-free 800 number now.



CALL TODAY TOLL-FREE
1-800/328-2406
In Minnesota call Collect
612/544-0335
U.S.A. TWX 910/576-2900
INTERNATIONAL
W.GERMANY 011-49-211-370831

dataserv
Your Authority in the IBM Second Market

DATASERV BUILDING, 9901 WAYZATA BOULEVARD, P.O. BOX 9488, MINNEAPOLIS, MN 55440

S/32
S/34
S/3
S/38
BUY • SELL • LEASE

CO?
COMPUTER OPTIONS, INC.
The Best Option
in IBM Computers
Parkdale Plaza Bldg #540W
1660 So. Highway 100
Minneapolis, MN 55416
612 • 544 • 8660
800 • 328 • 5718

BUY • SELL • LEASE • TRADE

SYSTEM 3 15D
Availeble Immediately
Sele or Leese

SYSTEM 34 or 38
Purchese/Leaseback
Substential Savings

Call for a Quote
(612) 546-0207

NORTHERN GROUP LTD, INC.
2124 IDS CENTER
MINNEAPOLIS, MN 55402

System 34's
Urgenlly
Needed

---

cis

IBM® amdahl®:

all systems, New and Preowned.
Buy, Sell, Lease, Trade.
A deal without talking to CIS is "no deal" at all
Phone 315/425-1900

3033
Lease financing new or used

3032
3032-8 available December

3031
Lease or sale

3168
U38 available attached processor

3158
All models memory features

370s
All types models

4300
Lease financing attractive rates

S/38, S/34
Delivery positions available

Peripherals
IBM & OEM buy sell lease

cis The worldwide
full-service leader
600 MONY Plaza, Syracuse, NY 13202
Phone 315/425-1900

San Francisco, CA	(415) 956-3040
Dusseldorf, West Germany	TLX: 8586367
Fribourg, Switzerland	TLX: 36585
Paris, France	TLX: 202714
Brussels, Belgium	TLX 26025
Tokyo, Japan	TLX 2322495

Member CDA, CLA

H·P

BUYING-SELLING

3000 SYSTEMS
2000 SYSTEMS
1000 SYSTEMS

CRISIS COMPUTER CORP
2356 Walsh Ave Santa Clara CA 95051 (408) 727-0431
For domestic and international sales TWX 910-338 7330

AMPEX USERS
WE
BUY - SELL - REPAIR
- DIGITAL TAPE DRIVES
- DISK DRIVES AND RELATED ASSEMBLIES

Call toll free
800-423-5321 Ext. 11
in California
213-889-6031 Ext. 11

TYMSHARE
Equipment Support Division

WE BUY, SELL, LEASE IBM®

SADDLEBACK MARKETING CORPORATION
Member Computer Dealers Association
1400 NORTH BRISTOL, SUITE 170
NEWPORT BEACH, CA 92660
PHONE: (714) 833-9800
TWX: 910-595-2550

WANTED
3540-B2 Diskette Reader
3344-B2
3203-5
1403-2, 2821-1, 2540
3135 I

SALE
NEW 4331-L2 January
USED 4331-I January
3340-B2
3340-A2
Model 2020 CPU
3330-11
3830-2
2560-A1
3215
3210

SALE OR LEASE
NEW 4331-L2 January
USED 4331-J; w/3310's, 8809; 3203-5; 3278's
3340-A2's, 3340-B2's, 3830-2

Sale or Lease New
TEXAS INSTRUMENTS
990-Based Computer Systems
Typical Configuration:
- 990/10 CPU with 224 K Bytes
- 2 CDS 200 MB Disk Drives
- 4 TI 911 VDT's
- 300 LPM Printer
- DX10 T/S Operating System
- Sort/Merge, System Utilities
- 1 Compiler (RPG II, COBOL, FORTRAN, BASIC or PASCAL)
- AUTOFORM Data Entry System
- Two Weeks Training at MDS

Price – $77,500 plus tax, freight and installation

TI field service available

Call us to discuss other configurations, peripherals, terminals and conversion from your present computer.

IMMEDIATE DELIVERY
for most configurations, including 990/12 CPU.

Manufacturing applications including BOMP, MRP, Production Control, etc., also available.

Call (213) 640-0404
Mini Data Systems
2041 Rosecrans Avenue
El Segundo, California
90245

Fully compatible systems and peripherals

VAX DRIVES
The first 300 MB Drive System to use the SBI and run Full DEC diagnostics.
NVM05 $28,900

NRWM05	300 MB & controller	$22,900
NRJM05	300 MB & controller	$20,900
NRWP06	200 MB & controller	$21,900
NRJP06	200 MB & controller	$19,900
NRWM03	80 MB & controller	$16,600
NRJM03	80 MB & controller	$14,600
NTU45	75 IPS & controller	$ 9,900
NTU77	125 IPS & controller	$11,900
NVT100	video terminal	$ 1,995

11/70, 11/34, 11/23 systems

Nationwide installation and maintenance
All equipment undergoes 7-day, error-free, on-line, burn-in.

NORDATA
4433 27th Ave. W., Seattle, WA 98119
Toll Free 800-426-2721

Contact: Bernie Gest
(215) 782-1010
7704 Seminole Ave.
Melrose Park, Pa. 19126

Computer Marketing Inc.

4341 - K or L
WITH PERIPHERALS
SALE OR LEASE
SHIP: FEBRUARY 1981

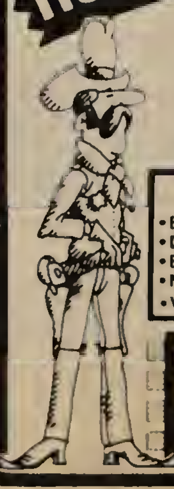
3203-5 PRINTER
IMMEDIATE DELIVERY

WANTED FOR PURCHASE
DISKS — TAPES — PRINTERS

WANTED!
MOST ALL
NCR
ELECTRONIC EQUIPMENT

SMITH ANDERSON CORP.
68-757 SUMMIT DRIVE
CATHEDRAL CITY, CA. 92234
(714) 346-3227
(714) 324-4427

HOW FAST ARE WE? ***Call Us Now!***
Most Equipment In Stock
For Immediate Delivery



Buy • Sell • Trade • New And Used
DATA GENERAL • DEC

- Ampex
- Century Data
- Printronics
- Data Products
- Tanberg
- CDC
- Soroc
- Hazeltine
- Diablo
- Centronics
- Western Dynex
- GE

DATA GENERAL		DEC	
•Eclipse 128KW	6400	•New VT 100's	1725
•DG 6045 Controllers	1500	•New MS 11LB	3900
•Eclipse 32KW MOS	1800	•New MS 11LD	5800
•New D/100, D/200 QTY. DISC.		•MS 11JP	695
•Various DG Modules	STOCK	•Various DEC Modules	STOCK

CRC Computer Resale Consulting Inc.
490 West Main St., Avon, MA. 02322
Call George Trawinski (617) 583-6460
Out Of State 800-343-1092 TWX/TELEX 7103451290
DG Peripheral And Board Repair Available

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

3033
Lease Financing and Purchase Leaseback
New and Used
Jack Shevillo

3032's
Sale or Short Term Lease Available Immediately
Jack Shevillo

WANT TO BUY OR SUBLEASE
3031
Bob Laurie

WANT TO BUY
AMDAHL
All Models
Gary Smith

3168
Short Term Leases
Features/Memory
Gary Smith

3158-3's
Priced to sell
Bill Graham

3148 3138
Lease or Sale
Immediate Delivery
Bob Laurie

4341
We have Late '80/Early '81 Delivery Positions
Don Dupuis

4331
Immediate Delivery
Joe Romeo

SYSTEM 3
Models 12 and 15
Dennis Pennington

SYSTEM 34
SYSTEM 32
Forest Benaway
SERIES 1
Marie Bednarz

3276
3274/3278
3287/3289
Kay Richard

3880 3420
3370 3411
3350 3203
3340 3211
Buy/Sell/Lease
Pat Callahan

WANT TO BUY
3380
Pat Callahan

COMMUNICATIONS
Buy-Sell-Lease
IBM 3705
IBM 3704
Immediate Delivery Configured To Your Requirements
Joe Romeo

CMI Since 1969 CORPORATION
755 W. Big Beaver, 19th Floor, Troy, Michigan, 48084
(313) 362-1000

MARKETING
Dallas, Texas (214) 385-0806
Long Island, New York (516) 673-9517
New Jersey (609) 645-7282
Montreal, Quebec (514) 288-8455
Windsor, Ontario (519) 258-8910
Geneva, Switzerland Telex: 289073 CMI CH
Paris, France Telex: 613910 CMI FR
Hamburg, W. Germany Telex: 211897 CMIHH D

CMI FINANCIAL SERVICES, INC.
755 W. Big Beaver, 20th Floor, Troy, Mich. 48084
(313) 362-1000

Member CDA/CLA

DEC

Specialists in DEC Systems and DEC Compatible Add-Ons

RM03	80MB	$ 8,000
RM05	300MB	$15,000
RP06	200MB	$14,000
RM07	675MB	$20,000

DATA SYSTEMS SERVICES
23901 Remme Ridge Rd.
El Toro, CA 92630
(714) 770-8024
Buy-Sell-Lease

WHEN YOU NEED DEC...

TERMINALS
- VT-100
- VT-103
- LA34
- LA120
- LA180

PDP 11/03
PDP 11/23
SYSTEMS

LSI/11 MODULES

Demand. . .Delivery
Demand. . .Discounts
Demand. . .UNITRONIX

UNITRONIX CORPORATION
(201) 874-8500
198 Route 206
Somerville, NJ 08876
TELEX: 833184

Short or Long Term Leases From
RANDOLPH
4300's
303X
...and all 370 CPU's and peripherals
800-243-5307

Randolph Computer Company
Division of The Bank of Boston
537 Steamboat Rd., Greenwich, Ct 06830
(203) 661-4200

4331s AVAILABLE

4331-J1-NOW-LEASE OR SALE
TWO 4331-K2-Dec. 5&12 SHIPS (LEASE ONLY)

PERIPHERALS ALSO AVAILABLE	3310 & 3370 DISK 8809 TAPE 3203-5 PRINTERS

NF COMPUTER SALES AND LEASING CORP.
OAK BROOK, IL 312/920-8181
MINNEAPOLIS, MN 612/854-1018

3 YEAR LEASE ON ANY 303X
New or Used
Call Charlie Albright
Sha-Li Leasing
Associates, Inc.
40 Wall Street
New York, New York
(212) 482-8840

BUY – SELL – LEASE – BROKERAGE
Let the
"NATIONS LARGEST WHOLESALE DEALER"
Buy, sell, lease, sub-lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units
COMPUTER INTERNATIONAL, LTD.
CWC's international division —
experts in foreign markets, freight, customs
BEACH COMPUTER CORPORATION, CWC's Leasing Division
COMPUTER WHOLESALE CORP., (504) 581-7741
SUITE 507/508 FIRST NATIONAL BANK OF COMMERCE BLDG.
NEW ORLEANS, LOUISIANA 70112
MEMBER OF COMPUTER DEALERS ASSOCIATION

DEC EQUIPMENT FOR SALE

RP06 RP04 RPR02 RM03 RM02
RK07 RK06 RK05 RL02 RL01

Controllers available for VAX, 11/70 and other PDP-11s.

Processors:	11/70, 11/45, 11/35, 11/34
Floating Point:	FP11-A, FP11-C
Memory:	MK11-BE, MS11-LD, MS11-LB, and core
Tape:	TWE16, TU10
Printers:	LP11, LA180
Terminals:	VT100, VT55, VT52, LA120, LA36
Comm:	DZ11-A, DZ11-C, DH11-AD
Card Rdr/Pun:	CTS11-KM, CR 11A
Backplanes:	DD11-DK, DD11-CK, DD11-B
Other:	DR11C, H960-CA, H960-CA

Carl R. Boehme & Assoc., Inc.
Specialists in Digital Engineering
408/727-2666

For Sale

3277-1's - $200
129-3 - $2,200/$90.00 per mo.

Want to Buy

Wordstream G-77 Display Stations
Wordstream G-120 Printers
3278-4 Display Stations
3278-2 Display Stations
w/4627 Keyboards

Contact:
Diane Prestigomo
Leasing Dynamics, Inc.
1717 East 9th Street
Cleveland, Ohio 44117
216-687-0100

4341

- Systems Available For Lease
- 4th Quarter 1980 Deliveries

COMDISCO
CALL YOUR LOCAL OFFICE OR
KAREN JOHNS
312-698-3000

LORD'S computer leasing corporation

CPU's

DPD

QTY	MODEL/FEATURE		
(1)	IBM	115 GF	Loaded
(1)	IBM	125 H	Loaded
(1)	IBM	138 J	Loaded
(1)	IBM	155 J	5 Ch. Dat.
(1)	IBM	158 K	+ 2 Meg OEM
(1)	IBM	158 K	
(1)	IBM	158 U34	Loaded
(1)	IBM	168 AP 5	+ 7 Megs OEM
(1)	IBM	4331 L2	Loaded
(1)	IBM	4341 L2	Loaded
(2) Megs	IBM	158-U32 to U35	

CRT'S

3272	M2	(3) 3250
3272	M2	(6) 3250
3277	M2	w/4633, 4630, 4632
3278	M2	w/4623, 4622
3278	M4	w/4627, 4622
Courier		2700's
Genesis		G77
3276	M14	3278

TAPES

3410	M3	Single	3420	M3	Single
3411	M3	Single	3420	M4	Single
3410	M1	Single	3420	M6	Dual
3411	M1	Single or Dual	3420	M7	Dual
			3803	M2	

I/O GEAR

1403	N1	w/8640
1403	M2	w/UCS
1442-6		off System 3
1445		
2540		
2821	M2	w/3615, 8637

ACT: John Hill (404) 998-1001

GSD

QTY			MODEL/FEATURE
(1)	IBM	4952 B	Series I
(1)	IBM	5415 D25	Loaded
(1)	IBM	5415 B19	Loaded
(1)	IBM	5415 D22	Loaded
(1)	IBM	System 32-B33	
(1)	IBM	System 32-24K	
(1)	IBM	5340 D34	
(1)	IBM	5340 E34	
(1)	IBM	5340 C33	
(1)	IBM	5410 32 K	
(1)	IBM	4955-D1	

COMMUNICATIONS

5231 M2
5235 w/1402, 1520
3775's
3776 M1
3776 M2
3777 M2 w/3203-M3, 2502
3872 Modems
2502 Card Readers

DISKS

3310 A2	3830 M1
3310 B2	7330 M1
3340 A2	7830 M1
3340 C2	
3344 B2	

I/O GEAR

2947-4
2956-5
3203 N2
3741 M1, 2 , 4
3742 M1, 2
5211 M2
5256 M3
2914-2x2

PO Box 249, Roswell, GA 30075

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 1600 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes
All orders shipped within 48 hours
Call or Write
Computer Tape Mart
169 B New Highway
Amityville, New York 11701
[516] 842-8512

DEC DEC DEC DEC DEC DEC

BUY SELL TRADE

Digital Computer Exchange
P.O. Box 4044
Hayward, CA 94544
415/538-3270

Brokers - Dealers - Consultants of

DEC PDP-11

Computer Systems & Peripherals

DEC DEC DEC DEC DEC DEC

BUY & SELL
WORD
PROCESSORS
WANG
DEC • IBM
Call John MacMahon
(617) 437-1100
AMERICAN USED COMPUTER
[illegible]

SALE or LEASE (We're sole owners)

IBM 4341 Model L
Avail 1/81

3742 DATA SYSTEMS from $3,295.00
($135 per mo. - 24 mo. lease)
IBM 029 ALL MODELS FROM $157.00
129-3 from $2,850.00

CALL GEORGE GILMAN
I.O.A. DATA CORP.
Toll Free 800-221-8438
N.Y. (212) 673-9300
383 Lafayette Street, New York, N.Y. 10003

DEC MEMORY IMMEDIATELY AVAILABLE

11/70	11/60	11/34	VAX
MK11BA	MS11KE	MS11JP	MS780DB
MK11BE		MS11LD	
MK11CA			
MK11CE			
MJ11BA			
MJ11BE			

IMMEDIATE DELIVERY —

SUBSTANTIAL DISCOUNTS —

NATIONAL COMPUTER EXCHANGE
6980 ARAGON CIRCLE, SUITE 5
BUENA PARK, CALIFORNIA 90620
(714) 522-1870 — (800) 854-7224

DATA GENERAL SPECIALISTS FOR

Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
— WE CARE —
JM Associates
601 W. Chapel Avenue — Cherry Hill, NJ 08002
609-663-1115

FOR SALE OR LEASE

IBM 4341/L Processor 12/80
IBM 4331/KJ2 Processor 12/80
IBM 3330/1 DASD 01/81
IBM 138/J Processor 01/81
IBM 145/IH2 Processor 01/81
HIS 316 Processor 01/81
Please Call: (312) 943-3770
Forsythe/McArthur Associates, Inc.
919 North Michigan Avenue
Chicago, Illinois 60611

FOR SALE
DEC
NEW!
- DZ 11A
- DZ 11C
- DH 11AD
- DH 11AE

IMMEDIATE DELIVERY
800 - 854 - 0350
(CALIF. 714-632-6986)

DATALEASE®
The DEC Specialists©
CALL NOW!

For Sale or Lease
HONEYWELL
716 System

Display Stations
for 200-2000
7705 Display Stations
7712 Page printer adapter
7714 Printer
All Equipment Available Immed.

URS
Since 1969
Call: Harvey Noel
(617) 438-4300
66 Montvale Ave.
Stoneham, Ma.
02180

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $73.50 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $147.00 per insertion. Extra space is available in half-inch increments and costs $36.75. Box numbers are $10.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): ____________________

Section: ____________________

Signature: ____________________

Name: ____________________

Company: ____________________ Title: ____________________

Address: ____________________

____

Telephone: ____________________

Send this form to:
CLASSIFIED ADVERTISING, COMPUTERWORLD
375 Cochituate Road, Route 30, Framingham, MA 01701

[illegible] seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT
COMPUTERWORLD
375 Cochituate Road, Rte. 30
Framingham, MA 01701

3310
3370
Disk Drives

Immediate
Delivery
call
Bob Bardagy
312•698•3000
Or Your Local Office

COMDISCO

DEC NOW

Vax Systems	CALL
11/23AA or Datasystems	NOW
11/04, RL01 System	$19,000
11/34A systems	NOW
11/70 W/RP06's or RM03's New and Used	NOW
Peripherals, disc tape, and boards	CALL
VT100	$1700.00

WANTED FOR CASH

any and all DEC systems and peripherals
All inquiries immediately answered

DATAWARE
SYSTEMS LEASE, INC.

30 Bay St.
Staten Island, N.Y. 10301
(212) 447-4911
Telex 429394
TWX 710-588-6738

FOR LEASE IN JANUARY

2-3350-A2F
6-3350-B2F
2-3350-C2F
2-3830-2

Neptune Computer Group, Inc.
16-16 Whitestone
N.Y. 11357
212-767-5100

GREYHOUND... wherever you need us, we are there.

Greyhound Computer Corporation has offices in a dozen U.S. cities and at six international locations to bring our computer leasing equipment, experience, people and resources direct to you. Call us for all your computer leasing needs today.

UNITED STATES

Arlington	(703) 521-0300
Atlanta	(404) 768-6535
Austin	(512) 451-0121
Boston	(617) 272-8110
Chicago	(312) 298-3910
Dallas	(214) 233-1818
Detroit	(313) 961-1675
Houston	(713) 447-0325
Los Angeles	(213) 670-7994
Minneapolis	(612) 370-1153
New York	(212) 832-2622
Philadelphia	(215) 293-0546
Pittsburgh	(412) 922-8920
St. Louis	(314) 353-8285
San Francisco	(415) 283-8980

INTERNATIONAL

Dallas ..... Greyhound Computer Overseas Corporation	(214) 233-1818
Geneva	22-61-27-54
London	1-891-4986
Paris	1-256-33-64
West Germany	89-85-10-59
Mexico	(905) 596-1860

CANADA

Toronto	(416) 366-1513
Montreal	(514) 281-1925

GREYHOUND
COMPUTER CORPORATION
800-528-6113
Greyhound Tower. Phoenix. Arizona 85077

TWO
3370 AI's
Dec. 26 Ship

SIX
3370 B1's
Dec. 26 ship

Computer Concepts, Inc.
6443 S.W. Beaverton Hwy.
Portland, OR 97221
503/297-4741

DEC

VT100AA $1595.00
RL211AK 6700.00
RL11-AK
RK711
DZ11A,B
DH11AD
DUP11DA
DL11W,E
BA11KE
DD11DK
DLV11E
LA11PA
DB11A
MS11JP
MS11LB
H960CA
H967
DR11C
DM11BB,DC
RM02 Packs

Western Data Systems
213/375-0523
PO Box 7000-182
Redondo Beach, CA
90277

IBM 158
APU's

Contact: Jerry A. Borisy
(303) 988-0820

JBI ASSOCIATES, INC.
12973 West 3rd Place
Lakewood, CO 80228

Member of Computer Dealers Association

Before you buy or sell used computer equipment consult

COMPUTER PRICE GUIDE

"The Blue Book of Used IBM Computers"

Quarterly publication contains current price information about used IBM computers and peripherals. Includes newsletter about current price trends and availabilities.

$8/per issue $24 annual subscription

Computer Merchants inc

75 South Greeley Avenue • Chappaqua, N.Y. 10514
(914) 238-9631

DEC
COMPUTERS

VAX11/780,
11/70, 11/34A

COMPONENTS

TU77, TU45, TE16,
TS11, MS780
RP06, RM03, RM05,
RK07, RL02

C.D. Smith & Assoc., Inc.
12605 East Freeway, #318
Houston, Texas 77015
Telex: 76-2547 CDSMITH HOU
713/451-3112

— DEC MEMORY —

64KB — $500
128KB — $1000
256KB — $2000
512KB — $4000

Your choice, one price:

- **Q-BUS**
- **UNIBUS**
- **VAX**

Terms, cash in advance. Delivery 15 days A.R.O.

Call Bea Ramos 1-800-538-8510
In California 408/736-6876
NATIONAL SEMICONDUCTOR CORP.

FOR SALE

Rendal Data Systems Model 550-11-096 small business computer. Processor has 96K RAM, three serial ports, one parallel port. In addition to CPU/desk console unit, system includes:

(2) CelComp T-50 45.7 megabyte hard disk drives, with disk controller board and two spare disk packs;

(2) Soroc IQ-120 CRT display units, with 24 line upgrade kit;

(1) Printronix Model 3203 300 line per minute matrix printer;
All necessary cables to interconnect peripherals, and all available documentation is also included.

Software includes the RTOS II time-sharing operating system, which supports RDS Business BASIC.

System has been in daily use for two years by a CPA firm in Ketchikan, Alaska. Freight FOB Ketchikan, Alaska. Seller reserves the right to refuse any and all offers. Interested parties should contact:

Walter W. Shuham, CPA
(A Professional Corporation)
P.O. Box 8400
Ketchikan, Alaska 99901
Phone (907) 225-4173

XEROX USERS

WE
BUY - SELL - REPAIR

- **COMPUTER SYSTEMS**
- **PERIPHERALS**
- **SUBASSEMBLIES AND SPARE PARTS**

Call toll free
800-423-5321 Ext. 14 or 15
in California
213-889-6031 Ext. 14 or 15

TYMSHARE®
Equipment Support Division

IBM Shipping Dates

System/34 - F37
April 24, 1981

5225 Printer
December 26, 1980

3370-A11,B11,A01,B01
January 2, 1981

DATALEASE CORPORATION
The IBM small systems financing specialists.
P.O. Box 467, Westport, CT 06881
(203) 226-9582

DEC **AVAILABLE IN STOCK** **DEC**

11/04 CPU's Big Box, Small Box, 50 & 60 hz
11/34A CPU's and Systems
11/70 CPU's with 50 hz or 60hz, 64kb to 512kb

DZ11A	$2400 new
FP11A	$3100 new
KW11K	$ 800 Used
MS11LD	$6000 New

ICS 11-MA Industrial control sub-system 50% off list
H775A and BA backups (year end clearance)
Several other Peripherals, systems, etc.

SWA South West Automation

Home Office (Katy, TX)
713/371-9288

West Coast Office (Sunnyvale, CA)
408/734-1117

Need to Buy

S/3
S/32
S/34

Buy Sell Lease

Full Systems
Peripherals
Operating Leases
Purchase/Leaseback
Martrex Marketing
Services
Al Morrill
800/328-3627
(except Minnesota)
800/362-3507
(Minnesota only)

URGENTLY NEEDED!
CASH AVAILABLE.

DEC
11/34
SYSTEM

CALL 617-437-1260

TIGER COMPUTER
415 Madison Ave., New York, N.Y. 10017, (212) 532-1500

Short or
Long Term Lease
3138-J w/ICA, IPA, IFA
Available 12/5/80

Buy/Sell/Lease
3350's 3830-1's
3340's 3830-2's
3344's 3803-1's
3330's 3803-2's
3420 Tapes All Models

Early Delivery
4341-L/4341-K
4331 Model 2's
Available for Lease

3031/
3032/
3033
Purchase/Leaseback

Lease-Short/Long Term
3148-K w/2150, 6111, 4660
Available 12/80

Sale or Lease
3310's
New or Used
3370's
New
Available Immediately

Available for Lease
3375's
3380's

Short/Long Term Lease
3158-K w/2150, 2151, 6111, 4650
Available 12/80

SPECIAL
Available for Lease
4341-L 2/20/81
Group II MES

A TIGER INTERNATIONAL COMPANY

MEMBER
CLA/CDA

Short Term
Operating Lease
4341

4300
Peripherals

BARRETT
(914) 682-1960

B-1860
Complete System

TD 833 CRT's
225 Disk Drives &
Controllers
4700 CPU's & Peripherals
TU 1806's and DC's

All eligible for maintenance.

DSI, INCORPORATED
2480 W. Alameda Ave.
Denver, Colorado 80223
(303) 922-8331
Telex: 910-931-0483

Member Computer Dealers Association

COMPUCOM

BUY-SELL-TRADE

PDP10 • PDP11
DEC SYSTEM 20
VAX/780

COMPUCOM INC.
3402 OAKCLIFF RD., B-7 ATLANTA, GEORGIA 30340
(404) 452-1090

DEC compatibles DEC
CONTROL DATA CORPORATION

Memory for:
LSI-11
(64 & 128K at $825 & $1960)
PDP-11
(128 & 256K at $1625 & $2340)
PDP 11/70
(512 & 1024K add-on at
$12,600 & $17,100)
VAX 11/780
(512K at $5,000)
High Capacity Disk Subsystems:
RM02, RM03, RP06, RM05 Compatibles
Magnetic Tape Subsystem:
TE16 Comparable
Micro-Term's VT100 & VT52 Compatibles
Compatible Controllers & Interfaces

SYSTEM TECHNOLOGY ASSOCIATES
Box 90057 HOUSTON, TX 77090
Houston (713) 440-8340
Dallas (214) 343-0845
Installation and Maintenance
"Serving DEC users in the SOUTHWEST"

DEC
IMMEDIATELY AVAILABLE

Communications		Disks		Tape		Options	
DZ11	DH11	RP06	RP05	TWE16	TE16	FP11A-C	
DU11	DUP11	RP04	RP03	TJU16	TU16	FP760	
DMC11	DL11E	RP02	RM03			BA11KF	KY11LB
DL11W	DL11A	RL02	RL01			KMC11	KG11A
		RK07	RK06			MR11EA	M9301

OTHER OPTIONS AVAILABLE
CALL FOR QUOTE

NATIONAL COMPUTER EXCHANGE
6980 ARAGON CIRCLE, SUITE 5
BUENA PARK, CALIFORNIA 90620
(714) 522-1870 — (800) 854-7224

BROOKVALE ASSOCIATES
BUY • SELL • RENT • TRADE
DEC

Terminals/Printers
LA11-PA LA180 w/M7258
LA120 BA Term w/Num Keypad
LA36 CE Keyboard DECwriter
LA38 HA DECwriter IV/Stand
LP11-VA 300 lpm Printer
LS11-A 60 lpm Printer
VT100-AA/NA CRT

SYSTEM FOR RENT
11/34 w/128Kb MOS
Dual RK06s and LA120
$2000/month

VAX SYSTEM FOR SALE
VAX 11/780 w/1mb memory
RP06, TU77, Full License

(800) 645-1167 • NEW YORK (516) 567-7777
40 ORVILLE DRIVE • BOHEMIA, NEW YORK 11716

For Lease
4341
Deliveries:
December '80
March '81
Contact:
Bob Kendall
Leasing Dynamics, Inc.
1717 East 9th Street
Cleveland, Ohio 44114
216-687-0100

IBM
5110 / 5120

SYS **32** SYS **34**
BUY - SELL
IBM MAINTENANCE GUARANTEED

NATIONAL
DATA
SYSTEMS, INC.
50 Congress Street
Boston, MA 02109
(617) 720-0370

Cardless IBM
System 3 Mod 10

5410-A14	CPU 16K
5471-1	Printer Keyboard
(2) 5444-2	9.8mb disk
5203-3	300 LPM printer
3741-2	diskette drive (direct attach).

On IBM maintenance
Puchase price $12,500
Roger Knopf, DP Manager
Granite Construction Co.
408/724-1011

370/158-3

1 year and 2 year term
December 1980
Call Charlie Albright
(212) 482-8640
Sha-Li Leasing
Associates, Inc.
40 Wall Street
New York, New York

BUY · SELL · LEASE
• • 5110 • •
S/32 , S/34
• • Series 1 • •
IBM MAINTENANCE GUARANTEED
(408) 425-7333
SOURCE
DATA PRODUCTS, INC.

AVAILABLE
NOW
3310 A2
3310 B2

NF COMPUTER SALES & LEASING CORP.
OAK BROOK, IL
312/920-8181
MINNEAPOLIS, MN
612/854-1018

For Sale — New
PDP 11/70
- December delivery
- RSTS/E system
- 2 RM03 disks
- QDMS Data Management

10% off
M.E. Congdon
(203) 728-6777
Quodata

Series/1

Discounts
- Equipment 5%
- Maintenance 15%

All new from IBM.
Attractive lease plans.

DATALEASE CORPORATION
The IBM small systems financing specialists
Westport CT • (203) 226-9582
Cumberland RI • (401) 333-0240
Atlanta GA • (404) 455-1480
Marlton NJ • (609) 983-0936

FOR SALE
IBM SYSTEM 3
MODEL 15D

1 5415 D25 384K, BSCC, Tape Attach
1 3340, (1) 3344
1 1403 N1, (1) 5421
16 3277's
1 3741 Direct Attach
1 3271, (1) 3284
2 3742
1 6602 Decision Data Printer and Attachment

Call T. Swann 1-205-934-3531
Available Feb. 1, 1981

FOR SALE
12 COMPLETE IBM SYSTEMS
Each has System 3 Model 10
5410 Processor 16K
5203 Printer 200 LPM
5424 Multi Function Card Reader
5444 Disk Drives
Bysync Adapters
All under IBM service
maintenance contract since new
Sell all or individually
Contact: Philip Cord
(516) 536-3833

For Sale
Texas Instrument
Mini-Computer

Intelligent Terminal - System Entry Level; Video Display Base; Single Station; 64K memory, Dual 8 in. disk drives; 810 Printer - 150 characters per second, 8 lines per in.

Programmer's guides available.

Call
800/523-6724

Accepting Bids for February Delivery
IBM System 3

Model 5415	D25	384K CPU
	8220	3741 attachment
Modal 40455	4601	Integrated Display Adaptar
	4602	Device Intarface
	7951	3411 Magnatic Tapa Attachmant
	1601	Channal Terminator Featura
	2094	BSCC
Modal 3277	001	Display Station (400 charactars)
Model 27899	4632	KBD: 78-CH Oparator Consola
Modal 3277 (9)	002	Display Station (1920 charactars)
	4631	KBD: 66-CH EBCDIC Data Entry
Modal 3340	A02	Disk storaga and control
Model 3344	B02	Disk storaga
Modal 3741	001	Data Station
Modal 1018	001	Papar Tapa Punch
Model 3742	001	Dual Data Station
	Also Including BST 750 printer	

For more detailed description or bid submission contact: **Daryl W. Ashby, H.J. Scheirich, Co., P.O. Box 21037, Louisville, KY 40221. 502/363-3583.**

70% OFF
11/40 RSTS System
$14,995
Complete

M.E. Congdon (203) 728-6777

Quodata®

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

DEC® CABLES

We have hundreds of cables to connect your Dec® equipment peripherals. Standard cables can be ordered cut to length required. Let us know your requirements and ask for our standard price list.

FEDERATED CONSULTANTS INC.
1218 S. ERVAY, DALLAS, TX. 75215
Phone: Brier 214/428-5300

®trademark Digital Equipment Corporation

B.C. HYDRO & POWER AUTHORITY
For Sale by Tender
As Is - Where Is
Ref. #Q-711

1 ea. 32K Bytes of Computer Memory for a PDP 11/44 CPU

For Tender Forms and/or further information contact Disposal Agent, B.C. Hydro, 3855 Kitchener St., Burnaby, B.C. Canada V5C 3L8. Telephone (604) 291-2211, Local 254.

Tenders will be due in the office of the Disposal Agent by 12:00 NOON on TUESDAY DECEMBER 16, 1980 and will be opened at 12:45 PM.

Clearance!
- **Series 1**
- **3741**
- **2780-2**
- **1130-2C SYS.**
- **1401 TAPE**

CALL NOW! 617-437-1100
AMERICAN USED COMPUTER
P.O. Box 68, Boston, MA 02215

3031-6
2 Year Term
January 1981
Call Charlie Albright
Sha-Li Leasing
Associates, Inc.
40 Wall Street
New York, NY
(212) 482-8640

IBM
3270
PRINTERS, TERMINALS & CONTROLLERS
Please Call: (312) 943-3770
Forsythe/McArthur Associates, Inc.
919 North Michigan Avenue
Chicago, Illinois 60611

SECOND SOURCE COMPUTERS, INC.

Can Deliver Now

SPERRY UNIVAC V77-800™
CPU And MEMORY

We Are The
First And Second Source

New & Used/Sales & Repair

SSCI™ Second Source Computers, Inc.
14762 Bentley Circle
Tustin, CA 92680
(714) 832-7724

COMPUTERWORLD

DEC VAX
Systems Memories Peripherals
Immediate Short Term Deliveries
call
BROOKVALE ASSOCIATES
800/645-1167 **516/567-7777**

For Sale (Avail. Now)
$39,995
(Approx. 20% Off)
Call collect:
404 - 252 - 7480

IBM SYSTEM 34
DATAMARC

MOD. C23 (64K, 27 MEG, D.D.)
5211-2 (300 L.P.M. PRINTER)
5251-11 (DISPLAY)

WE BUY, SELL, AND INSTALL
NEW AND USED COMPUTER ROOM FLOORING

Raised Floor Installation, Inc.
19 Sebago St.
Clifton, N.J. 07013
(201) 778-2444 In New Jersey
(212) 594-4039 In New York
(415) 546-9466 In California

FOR SALE
DEC 11/34 w/DZ 11
VT 100
LA36
(2) RK07 Drives
RSTSE and RMS 11K
One Year Old
Under DEC Maintenance
Mike Kirk
(816) 561-3955

UNIVAC
BC/7-800
128 K CPU
2 5M removable disk drives
2 5M Fixed disk drives
4 0.5M diskette drives
3 CRT's
1 250 LPM Printer

Univac maintained since new
Call F. Levinsky at
301/760-3447

FOR SALE OR LEASE
4341-L
MARCH, 1981
PAUL SHEEDY
(312) 991-6262

INTERSTATE COMPUTER
SALES AND LEASING INC

SALE
DATAPOINTS
(1) 4530 20MB WANCO with or without processor
(3) 4220 5 MB WANCO
(1) 4220 5 MB DIABLO
(4) 60 cps Freedom Printers

All under maintenance. Make offer to Hunter Douglas Inc., P.O. Box 650, Durham, N.C. 27702, Attn: DP Dept.

BUY/SELL/LEASE
303X
138, 148, 158, 145
3330, 3350, 3420
Call Us Collect

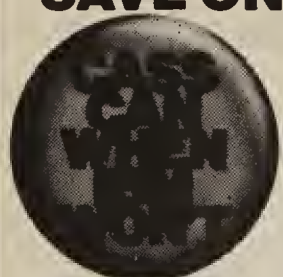
UNITED STATES	
Boston: Eastern Regional Headquarters	**(617) 272-8110**
Washington, D.C.	(703) 521-0300
New York	(212) 832-2622
Philadelphia	(215) 293-0546
Austin: Southern Regional Headquarters	**(512) 451-0121**
Atlanta	(404) 768-6535
Dallas	(214) 233-1818
Houston	(713) 447-0325
Chicago: Central Regional Headquarters	**(312) 298-3910**
Pittsburgh	(412) 922-8920
Detroit	(313) 961-1675
Minneapolis	(612) 370-1153
St. Louis	(314) 353-8285
San Francisco: Western Regional Headquarters	**(415) 283-8980**
Los Angeles	(213) 670-7994
CANADA	
Toronto	**(416) 366-1513**

BROKER/DEALER SALES AND LEASING
Phoenix: (602) 248-6848

168, 303X	**Chuck Smith**
135, 145, 155	
138, 148, 158	**Dave Revere**
Peripherals	**Keith King or Sandy Mitchell**
Communications & Terminals	**Craig West**
OEM Memory & 360	**George Beck**
GSD	**Wayne U. Smith (415) 283-8980**

GREYHOUND COMPUTER CORPORATION
800-528-6113
Greyhound Tower Phoenix Arizona 85077

SAVE ON IBM COMPUTERS



- ☑ **Save thousands of dollars**
- ☑ **Deliver quickly**
- ☑ **Take trade-ins**

We specialize in full systems, up- grades, or add-on parts. **System/34 System/32 System/3** We buy IBM equipment whether owned, or rented from IBM.

Cass Marketing Services Inc.,
535 N. Brand Boulevard, Glendale. Calif. 91203
(213) 956-4982 • (800) 423-2662 Toll Free Outside Calif.

370/125'S
370/115'S
For Sale* Lease* Purchase
****Purchase Leaseback***
Short Term Leases Available **Also all Peripheral Units.**

CORPORATE COMPUTERS, INC.
(203) 661-1500
Member CDA
115 Mason St., Greenwich, CT 06830
Member Computer Dealers Association

3·32·34·38
Buying · Selling · Leasing

OWENS
COMPUTER GROUP Inc
a datacomp computer leasing company
7300 W College Dr. • Palos Heights, IL 60463
Call Collect 312/448-4300

buy sell swap

4341K
For Lease

Shipping from IBM 2-12-81 with 4 - 3370's and other peripherals.

Call:
John H. Crilly
Sun Data, Inc.
800-241-9882
In Georgia:
404-449-6116

FOR SALE
IBM SYSTEM 3/15D

256K Memory
Diskette I/O
3340 A2-B2 Disk Drives
1403 Printer 465 LPM
(9) 3277 CRT's
IBM Maintenance
Available March 1, 1981

Call:
Richard Saiers
(717) 236-9307

For Sale
IBM 370 Computer
Model 145

IBM terminals,
model 2740
IBM sorters, model 082

For bid forms and complete details write to:
Myrton L. Hall
Assist. Supt. of Schools
Dept. of Business Services
3902 Davenport St.
Omaha, Nebraska 68131

For sale
IBM 370/135
with 512K &
1403-N1
Printer

Sealed bids will be received until 3:00 p.m. January 12, 1981, in the Business Office, East Tennessee State University, Johnson City, TN 37614

Send for Specifications

DEC LSI-11
SURPLUS SALE

KD11-HD/KDF11-HF
RL02-AK/MSV11-DD
All new, low CIA prices.

John Marcus
COMPUMART
617/491-2700

For Sale By Owner
Series 1
4955

128K, 9.3mb disk, 2 diskettes, 4974 printers, 4978, 4979, LSI DECwriter terminals, asynch, bisynch, floating point.
Continuous IBM maintenance.

AIF Inc.
10200 W. 75th
Shawnee Mission, KS 66204
913/384-2360

UNIVAC
BC/7-800

128k CPU
20mb disk storage
1 IBM 3741 compatible
diskette unit
1 250 LPM printer
2 CRT's
Available March 1981

Call Harold Dahlberg
at 201/791-5100

---

buy sell swap

Mini Computer
For Sale By Owner
Sperry-Univac
BC/7-800

40MB, 3 CRT's, and
600 LPM printer.
Hardware and software support available through Univac.

Call:
Steve Kane
714/937-0678

Available
Immediately
(2) RP04 AA
DEC DRIVES
Under DEC
Maintenance

Call:
Jack Cameron or
Terry Jones
806/335-1511

FOR LEASE
IBM 4341 L
with
MES UPGRADE TO MODEL 2
AVAILABLE, DECEMBER 1980
5 or 7 YEAR TERMS
Substantial Cash Flow Savings
over
IBM Lease/Purchase

Contact:
Dave Parlin
Near East Leasing
513-272-1081

DEC PARTS
FOR SALE

At stated prices or best offer higher than the stated price.

TU10 & controller	$8,000
LP11-VA	$6,000
(2) RPR02 disks and controller	$10,000
DH11-AD	$6,000

800/325-9494
314/962-0382
Sauer Computer Systems
St. Louis, MO

IBM SYSTEM 34
WORD PROCESSING
PRINTER

The GBT 5200WP letter-quality printer consisting of an NEC Spinwriter and a GBT controller attaches just like an IBM S/34 5256 matrix printer.

GENERAL BUSINESS
TECHNOLOGY, INC.
2630 Walnut Avenue,
Tustin, CA 92680
(714) 731-2346

Must Sell
11/34

with 256KB
DZ11
2 each, RK06's
VT 52
LA 180
RSTS/E VER 7.0

Digital Computer Resale
713/440-5845

Terminals
For Sale
ADM-3A and
Texas Instrument
745

Immediate
Delivery

Call George Coe
717/326-2461
ext 450

---

buy sell swap

IMMEDIATE
NEED!
5110 B22

Contact:
JACK ROACH
Northern Group
Ltd., Inc.
(612) 546-0207

For Sale By Owner
IBM System 3
Model 15D

5415/512K
500 million bytes of disk
1100 LPM Printer
50+ displays and
4 printers/3270 family.
All items covered
by IBM maintenance.
Currently in use,
systems available early 1981.

Contact Barbara Schwartz
516/349-0500

4341L
12-19-80

Flexible Lease
2 Years or Longer
Group 2 on Order

Western Computer
Leasing, Inc.
602-997-7245

REAL
ESTATE

Office Building
Brooklyn, N.Y.

Ideal for computer service company. Ocean Parkway area. Excellent for transportation. Newly renovated office building. Central air and alarm system. Sufficient electrical power. 30,000 sq. ft. Attractive rental.

201/287-4800
Mr. Costantino
or Mrs. Phillips

SOFTWARE
WANTED

Wanted to Buy
PDP 11/34 USER

looking to purchase wide variety of application packages including Accounting, Order Entry, Sales, and Time & Territory Analysis.

Please forward sample reports and product information to:

Controller
P.O. Box 469
Addison, Ill. 60101

---

software for sale

software for sale

SOFTWARE
FOR SALE

---

the IBM Solution
HASPBOX™

SOFTWARE RESULTS CORPORATION

the CDC Solution
UT200BOX™

RSTS•VAX•RSX!
DATA COMMUNICATIONS

- INSTALLATIONS THROUGHOUT NORTH AMERICA AND EUROPE
- FRONT END PROCESSOR-BASED FOR LOW OVERHEAD
- FULL LINE UTILIZATION FOR HI-THRUPUT (UP TO 19.2 KB)
- USER INTERFACE DESIGNED FOR RELIABILITY AND SIMPLICITY

614/421/2094 COLUMBUS OH 43212 USA TWX 810 482 1631

SOFTWARE
for the
HONEYWELL
LEVEL 6

PROVEN reliable software from the Computer People.

CD systems, inc.
THE COMPUTER PEOPLE
14614 Grover St., Suite 200
Omaha, Nebraska 68144
(402) 330-2310

OMNIDATA

INTERACTIVE data management package for DEC (RT-11) and BASIC/4 systems.

BERMAN ASSOCIATES
Suite 14, 101 East Holly Ave.
Sterling, VA 22170
(703) 450-5000

WORD PROCESSOR
ENHANCEMENTS

TIPEX, the new enhanced version on TI's TIPE-990 Word Processor retains all of the original functions plus significantly increases the versatility & ease of operation. Some features include global search & replace, automatic indent, and column totaling. **TIPEX** runs on any TI DS990/4 or greater with DX10 Operating System.

INTEGRATED
COMPUTER
SYSTEMS, INC.
9009 Gaither Road
Gaithersburg, Maryland 20760

GRAPHICS SOFTWARE
for
PRINTRONIX/TRILOG
PRINTERS

ALL MAJOR COMPUTERS

CERRITOS COMPUTER SERVICES, INC.
4320 Atlantic Ave., Dept. B
Long Beach, CA 90807
(213) 595-8607

Now Enhanced for the 1980's!!!

IBM
RPG II System 3, 32, 34
Software
Packages

GENERAL LEDGER
ACCOUNTS RECEIVABLE
PAYROLL
ACCOUNTS PAYABLE
INVENTORY
ORDER ENTRY-INVOICING

- Proven Reliability
- Over Ten years successful use
- 100's of users throughout the U.S. and in foreign countries

Fully supported, documented and warranted ready to use financial software. On site installation and support available

CPAS (612) 927-4411
ComPuter Accounting Systems
3033 Excelsior Boulevard
Minneapolis, Minnesota 55416
Leader in Financial Software™

OEM's AND END USERS

RDOS/Extended Basic
BLIS/COBOL
Order Entry
Inventory Control
Accounts Receivable
Accounts Payable
Payroll
General Ledger
Unique Licensing and Pricing

Benchmark Systems of Michigan, Inc.
P.O. Box 167
Ravenna, MI 49451
(616) 853-2226

Z8002 Microprocessor
Cross Assembler
for the IBM 370

Zilog Z8002 mnemonics
Macros
Output in Tektronix format

Supplied as unloaded SYSLMOD on magnetic tape, specify maximum region available and tape density desired.

$960

Alan Associates
605 Locust Lane
State College, PA 16801
(814) 234-1061

WORD PROCESSOR —
MAILING MANAGEMENT SYSTEM
IBM S/32, SYSTEM/34 USERS

Package includes Document/Letter entry & maintenance, text editor, letter writer-mult. pages, name & address file entry & maintenance, name & address listing, label print program, extended zip code capability, 30-day trial offer, well documented. Call or write if questions. Introductory offer: $350.00. Use to enter & maintain documents, letters, reports, mass mailings, system documentation, store & maintain special forms such as pro-forma statements, estimates, etc. **Order from ALLCO SYSTEMS, 615 Burnett Ave., Suite 3, P.O. Box 274, San Francisco, CA 94101.**
415/285-4626.

HP-3000 PRODUCTS COBOL/VIEW/IMAGE

FEATURES:
- Structured Design
- Data Base
- On-Line/Interactive
- Source Code Available

APPLICATIONS:
- Order Entry
- Invoicing
- Inventory Control
- Accounts Receivable
- Accounts Payable

UTILITIES
- Monitor
- Terminals Spooler (includes autospool)

Please call or write

Program Products Manager

MODLINE
3220 S.W. First Ave.
Portland, OR 97201
503/220-0220

NEW FOR SYSTEM/34

GENERATE ON-LINE F/M PROGRAMS – ON-LINE ADD/CHG/DEL/INQ 58 FIELDS, REPORT OUTPUT

S/34 DOCUMENTATION AND ANALYSIS AID SYSTEM

OTHER SYSTEMS FOR S/3 AND S/34 – A/P, G/L, A/R, P/R, OTHER

(EXTENSIVE DOCUMENTATION, RPG II SOURCE PROVIDED)

BANCROFT COMPUTER SYSTEMS, INC. (318) 388-2236
P. O. Box 1533 West Monroe, Louisiana 71291

How to count your chickens before they hatch.

All you need is a DEC PDP-11 with RSTS and FINAR – the financial analysis and reporting language.

- *Budgets*
- *Cash flow*
- *Planning*
- *Project evaluation*
- *Forecasts*
- *Consolidation*

FINAR SYSTEMS
132 Nassau St., Suite 212
New York, NY 10038
(212) 222-2784

SYSTEM 34 WORD PROCESSING

Paratext $500

- Full Service Text Editor
- Enter, Edit, Store Text
- Automatic Centering
- Automatic Justification
- 3 Print Programs
- Individual Forms Design

- Memos
- Contracts
- Documentation
- Sales Brochures
- Business Letters
- Marketing Campaigns

For documentation, call Jeffrey Papows (617) 546-3413

Para Research, Rockport, MA 01966

RSTS/E BASIC+ DECOMPILER $500

(Single installation license)

UNBAC — translates .BAC compiled programs into the original .BAS source code. Field proven — no bugs reported in over 1 year of use.

Multiple installation license $1000.

Custom Computer Applications
P.O. Box 18417
Memphis, TN 38118
901/382-1325

HIGH-QUALITY ACCOUNTING AND FINANCIAL REPORTING SOFTWARE

For Dec (RT-11, RSX-11M) and Prime Mini-Computers

- General Ledger & Financial Reporting
- Payroll
- Professional Time & Billing
- Accounts Payable
- Accounts Receivable

COMPUTING

3550 N. Lexington/St. Paul, MN 55112
call toll free 1-800-328-9574
In MN call collect 612-484-8800

●
RPG/RPG II to COBOL
●
COBOL to COBOL
●
FORTRAN to FORTRAN
●
NEAT/3 to COBOL
●
DIBOL to COBOL
●

Converting is easy with

DASD™

●
Proven software
●
Experienced personnel
●
Nationwide offices

CHECK WITH US TODAY

DASD Corporation
Corporate Services Center
Dept. 130/9045 North Deerwood Dr.
Milwaukee, WI 53223
(414) 355-3405

NEW LIFE FOR *1401* PROGRAMS

CS-TRAN converts your 1401 *object* programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the *only* translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

C·S Computer Systems Inc.
90 John Street, New York, NY 10038
212-349-3535

DATAPOINT SOFTWARE

- General Ledger
- Accounts Payable
- Accts. Receivable
- Sales Analysis
- Purchase Analysis
- Personnel
- Payroll
- Job Costing w/BOM
- Country Club Acct'g
- Membership & Mailing

Complete Databus Source
No Royalty Payments
1500, 1800, 5500, 6600 and ARC compatibility.
Demonstrations available.

Call or write:

MINI-COMPUTER SUPPORT GROUP, INC.
3645 WARRENSVILLE CENTER ROAD
SHAKER HEIGHTS, OHIO 44122
216-283-2000

SERIES/1 USERS

DSI now has available for immediate on sight installation a key-disk software package available on your EDX operating system, utilizing IBM 3101's and/or 4978's.

Custom installation and/or conversion from CMC/PERTEC* ENTREX/NIXDORF* FOUR PHASE* CADE* INFOREX* is now available.

Datronic Systems Inc.
940 Springcreek Pkwy.
Plano, TX 75023
214/596-2774

All Hands on DEC

Good news. It's smooth sailing for financial modeling, analysis and consolidation applications because the FCS-EPS system is now available on DECsystem-10, DECSYSTEM-20 and PDP-11-70 CPU's.

FCS-EPS is the comprehensive package for developing decision support systems with a minimum of time and effort. More than just a modeling tool, FCS-EPS is a sophisticated, open-ended system utilizing a financially-oriented language easily applied by non technical people. "What if" analysis, statistical analysis, risk analysis, hierarchical consolidation . . . it's all within the grasp of the financial information user with FCS-EPS.

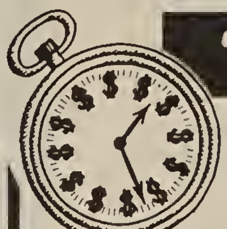
Find out more about what to look for in truly user-oriented financial planning systems. Write today for our free brochure: "Selecting and Evaluating Financial Modeling Systems".

eps
EPS Consultants, Inc.
8600 W. Bryn Mawr
Chicago, IL 60631
Phone: 312-693-2470

____ Yes, send me a copy of "Selecting and Evaluating Financial Modeling Systems".

____ Yes, send information on FCS-EPS.

Name: ____________ Title: ________
Company: ____________
Address: ____________
City: ______ State: ______ Zip: ______
Telephone: ______ Computer now in use: ______



THE TIME SAVERS

RPG to COBOL
or for those PL/1 Shops
RPG to PL/1

Two of the many **successful** translators offered by Dataware provide a smooth and effortless transition from RPG. The translators can handle most any level of RPG (SYS/3, Mod 20, etc.) and achieve an extremely high percentage of automatic conversion (approaching 100%) of the source code.

For more information please call or write today!

The Conversion Software People

Dataware, Inc.
2565 Elmwood Ave., Buffalo, NY 14217 (716) 876-8722
TELEX 91519

TIME & SERVICES

370/158 AP 8 MEG
OS/MVS/JES II
RJE/TSO/CICS/ BATCH
XEROX 9700
Laser Printing Service

Excellent availability/
All shifts
Highly competitive rates
24 hours/7 days a week
Contact: Al Kolovchevich
(212) 484-8303

WARNER DATA SERVICES
A Warner Communications Company
75 Rockefeller Plaza
New York, N.Y. 10019

Thomas National, Inc.

XEROX 9700 Laser Printing Service

- 8½ x 11 Paper in Portrait or Landscape Mode
- Custom Designed Forms
- More than 200 Fonts available
- Cost savings in mailing, storage and handling
- Competitive prices.

For information, prices or free demonstration call (212) 765-8500

Thomas National, Inc
1700 Broadway, New York
NY 10019

TN

time & services

time & services

time & services

MEMORY & COMPUTER REPAIRS

ANY MANUFACTURER'S MEMORIES

CORE — SEMI

DEC® — DATA GENERAL

COMPLETE CPU'S AND MEMORIES

THREE DELTA CORP
1038 Kiel Court, Sunnyvale, CA 94086
(408) 734-2680
TWX-910 339-9511

DEC TIME SHARING
PDP-11/70

Available for:
- Program Development Computer Conversions
- Overloads/Special Applications
- Applications, General Ledger, Word Processing
- Apple Micro-Computer to DEC

Languages-COBOL/DIBOL, BASIC, RPG, FORTRAN
Utilities-Datatrieve-11, OMSI Sort, DECform, RSTS/E

SEC COMPUTER COMPANY
AN AFFILIATE OF CONTINENTAL FINANCIAL SERVICES COMPANY

Contact: Robert Chomko
(312) 298-0997

1580 N. Northwest Highway
Park Ridge, IL 60068

DELAWARE VALLEY
TIMESHARING
Eastern Pennsylvania
Philadelphia
South Jersey

DEC 11/70 RSTS/E

24 hours - 7 days
Most commerical packages
Custom work, Raw time

NATIONWIDE DATA DIALOG
70 James Way
Southampton, Pa. 18966
215-364-2800

COMPUTER REPAIRS

NOVA 1200, 2, 3
ALL BOARDS
CPU-MEMORY – I/O ETC.

MEMORIES AND POWER SUPPLIES
ANY MANUFACTURER

90 Day Warranty – 10 Day Turnaround

DIGITAL DATA SYSTEMS, INC
1396 N.W. 65 Terr., Plantation, FL 33313
Florida (305) 792-3290
Boston (617) 491-3859
Chicago (312) 475-4435
Philadelphia (215) 272-7442
OUR 8TH YEAR OF SERVICE

TIMESHARING

SAVE 50% AND MORE ON CMS,TSO, ETC

As computer time brokers, we offer reliable timesharing services at rates far below those of national timesharing firms.

Computer Reserves, Inc.
(212) 599-0770
(201) 676-1881

Computer Time Brokers & Specialists

- On-site or remote processing
- Serving the Tri-State Area

BROOKE COMPUTER CORP.
250 W 57 ST., NEW YORK, NY 10019
212/586-0923

Computerworld's classifieds work.

TIME BROKERS INC.

SELLERS OF COMPUTER TIME

(212) 921-8855

NY • NJ • PA • CT

tbi SINCE 1964

BROKERS OF COMPUTER TIME

On-site time: N.Y. metro area only
Timesharing & RJE: Nationwide

Computer Reserves, Inc.
(212) 599-0770
(201) 676-1881

370/168 mod 3 Datacenter

6.0 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerlevsky
(212) 564-3030

Datamor
132 West 31 St.
New York, N.Y. 10001

I.B.M. 360-40

All Shifts, 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility.

From $35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036
Contact:
Al Palmo (212) 997-1413
Charles Leigey (212) 997-1411

PDP 11 RSTS/E
TIMESHARING

* Serving L.A. and Orange County
* $6 per Hour
* Terminal Leasing Available
* Basic-Plus 2, RMS-11 K, FORTRAN IV

Contact: Al Noton
(714) 994-3241

COMMAND COMPUTER SERVICE, INC.
14402 Industry Circle
La Mirada, CA 90638

CURTISS WRIGHT Computer Services

370/158-3
VS1 - CMS - DOS
REMOTE JOB ENTRY
INTERACTIVE COMPUTING
TURNKEY SYSTEMS
PACKAGED PROGRAMS
(201) 777-3454

15 Minutes from Lincoln Tunnel
One Passaic Street
Wood-Ridge, N.J. 07075

Data Entry
Conversions
Setting Up

Let an expert organization help you accomplish these tasks right the first time.

JGB Systems
New York
(212) 923-2682

ADVERTISERS' INDEX

Alanthus ... 33
American Key Data ... 60
American Terminal Leasing ... 12, 26, 27
Application Software ... 39
Axios Products ... 64

BDS Computer Corp. ... 69
BMC Software ... 17
John Beall ... 63
Beehive International ... 50
Britton Lee ... 7

Cara Corp. ... 80
C.G. Distributors, Inc. ... 66
Cincom/Systems Software ... 78
Coastal Data Products ... 54
Commercial Dataprocessing ... 44
CompEd ... 16, 72
Computer Alliance ... 39
Computer Concepts, Inc. ... 49
Computer Development, Inc. ... 38
Computer Power Products ... 30
Computer Sciences Corp. ... 20-21
Computer Systems Research ... 28
Computer & Terminal Exchange ... 33

Data Access Systems ... 74
Data General/Scientific/Industrial ... 35
Data Processing Design ... 36
Datapro Research Corp. ... 47
Data Structures ... 48
Data Systems for Industry ... 15
Data Systems Services ... 9
Datum ... 75
Digital Communications Corp. ... 60
Digital Equipment Corp./Networking ... ID/4-ID/5
Digital Equipment Corp./Terminals ... 26-27
Digital Equipment Corp./TPL ... 74
Dorlen Products ... 79
Duquesne Systems ... 71

EDP Security ... 55
Engineered Products ... 46

Fairleigh Dickinson University ... 31
Formation ... ID/2
F/S Computer Corp. ... 53

General Terminal Corp. ... 65

Hamilton Rentals ... ID/8
Honeywell Information Systems ... 52

IBM/DPD ... 25, ID/10-ID/11
ILM Corporation ... ID/10
Infodata Systems ... ID/7
Informatics/Software ... ID/3
Informatics ... 55
Innovation Data Processing ... 13
Innovative Electronics ... ID/15
Insac Software, Inc. ... 5
Instor Corp. ... 64
International Data Processing ... 18
Intertec Data Systems ... 19
IPL Systems ... 24

J & G Industries, Inc. ... ID/15

Locom Corp. ... 34

2M Corporation ... 79
Management International ... ID/11
MCBA ... 72
McCormack & Dodge ... 116
Memorex Communications ... 61
Mini Micro Education ... 45
MRC Industries ... 66

National Advanced Systems ... 57
National Information Systems ... 56
National Network of Professional Women ... 68
National Terminal Brokers ... 13, 14, 36, 46
NCC/Terminal Brokers ... 13, 14, 24, 36, 46, 71
NCR ... 51
Nixdorf Computer Software Co. ... ID/6

Ohio Scientific ... 29
On Line Business Systems ... 30
D. Owens & Assoc. ... 48

Pacific Mountain States Corp. ... 18
Perkin-Elmer Corp. ... ID/16
Phoenix Computer Corp. ... 12

Qwikterm ... 10

Racal-Telesystems ... ID/14

Schwab Safe Co., Inc. ... 34
S & H Computer ... 67
Signal Technology ... 32
Software AG ... 58
Software International ... 22
STD Engineering Corp. ... 18
Storage Technology Corp. ... 73
Syncom ... 39

Teleray ... 39
Telex ... 40
Terminal Systems ... 68
Timeplex ... 23
Tone Software Corp. ... 68
T.T. Teletype ... 37

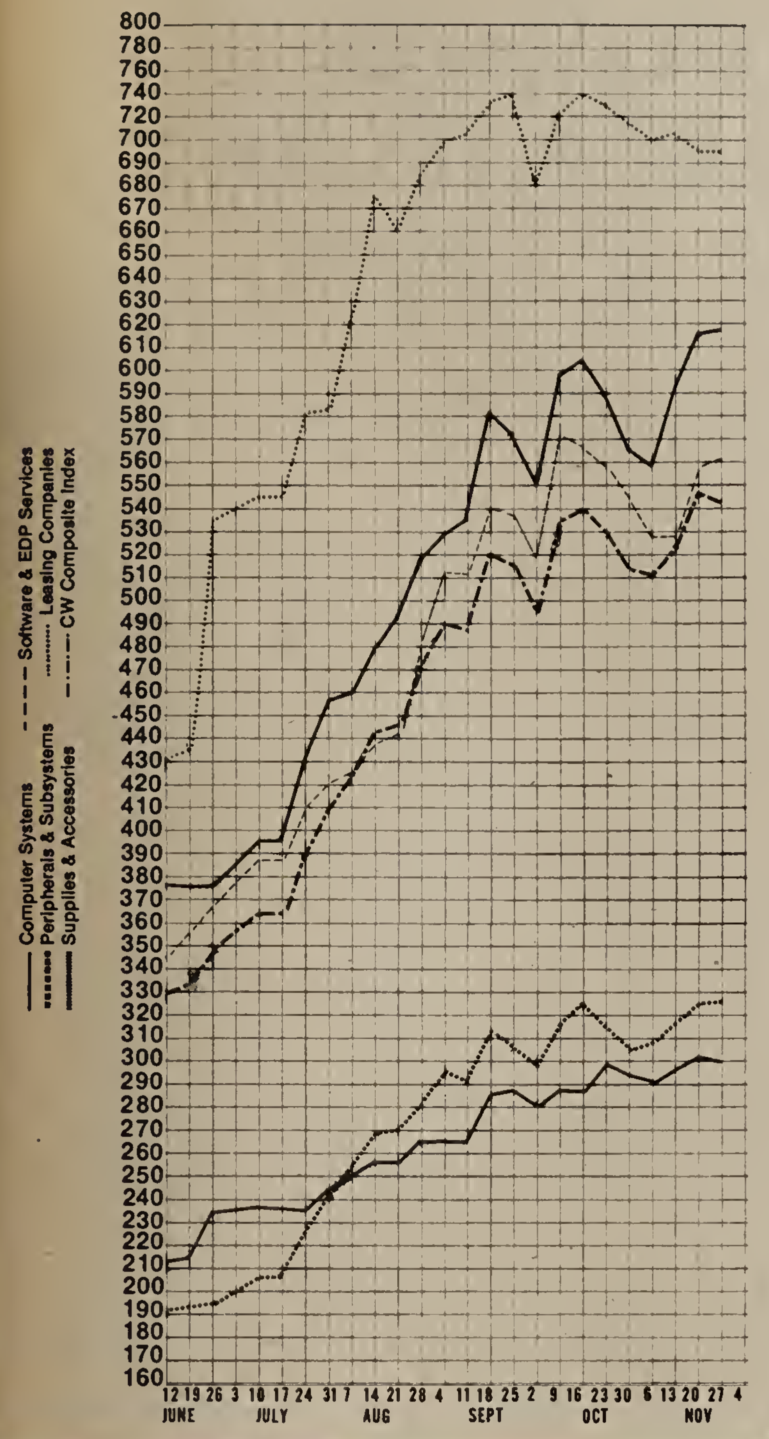
United Peripherals Corp./Microcomputer Systems Corp. ... 44-45
Ultimate Corp. ... ID/9

Vector Graphic ... ID/12-ID/13

Westwood Assoc. ... 66
Whitlow Computer Systems ... 3

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Stock Trading Index



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
VP-Research Jack Edmonston
VP-Marketing Roy Einreinhofer
VP-Editorial E. Drake Lundell, Jr.
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan
VP-Production Lee Vidmer

Computerworld Headquarters
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

SALES
Vice President Roy Einreinhofer
Display Adv Mgr Frank Collins
Display Adv Melinda Walker
Jonna Yager
Jenny Charlesworth
Classified Adv Mgr William J. Mills

MARKETING SERVICES
Vice President Jack Edmonston
Director Research Kathryn Dinneen
Sales Promotion Peter Segal

CIRCULATION
Vice-President Margaret Phelan
Circulation Mgr Barbara Jeannetti
Service Rep Peggy Kelly
Assistant Carmela Priante

PRODUCTION
Vice-President Lee Vidmer
Production Mgr Peter Holm
Supervisor Henry Fling
Typesetting Mgr Tom Pfau

Computerworld Sales Offices

Roy Einreinhofer
Vice-President/Marketing
Frank Collins
Manager, Display Advertising
William J. Mills
Manager, Classified Advertising
Diana La Muraglia
Manager, International Marketing Services
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

BOSTON
Robert L. Ziegel
Northern Regional Director
Chris Lee
Edward P. Marecki
District Managers
Kathy Doyle
Susan Wolffe
Account Coordinators
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

NEW YORK
Donald E. Fagan
Eastern Regional Director
Peter Senft
Michael J. Masters
District Managers
Candy Kelly
Account Executive
COMPUTERWORLD
Paramus Plaza I
140 Route 17 North
Paramus, N.J. 07652
Phone: (201) 967-1350

CHICAGO
Dave Dolber
District Manager
Jane Wrightman
Account Coordinator
COMPUTERWORLD
2600 South River Road
Suite 304
Des Plaines, Ill. 60018
(312) 827-4433

LOS ANGELES
Jim Richardson
District Manager
Bob Hubbard
Account Manager
Kathie Knox
Account Coordinator
COMPUTERWORLD
3420 Ocean Park Boulevard
Suite 3020
Santa Monica, Calif. 90405
Phone: (213) 450-7181

SAN FRANCISCO
William J. Healey
Western Regional Director
Barry G. Milione
Bob Stetson
Account Managers
Ruth Gordon
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

JAPAN
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-6101
Telex: J2424461

UNITED KINGDOM
Steve Burton
IDG PUBLISHING LTD.
146 Clerkenwell Road
London EC1
Phone: (01) 837-1222
Telex: UK-269477

Euan C. Rose
BEERE, HOBSON ASSOCIATES
34 Warwickshire Kenilworth
Warwickshire, CV8 1HE
Phone: (0926) 57619
Telex: UK-311951

WEST GERMANY
Eckhard Utpadel
CW PUBLIKATIONEN
Friedrichstrasse 31
8000 Munich 40
Phone: (089) 34-90-61
Telex: W.Ger-5-215250-HKFD

AUSTRALIA
Alan Power
COMPUTERWORLD PTY. LTD.
37-43 Alexander Street
Crows Nest, NSW 2065
Phone: (02) 439-5133
Telex: SECCO AA25468

BRAZIL
Eric Hippeau
COMPUTERWORLD do BRAZIL
Servicos e Publicacoes Ltda.
Rua Alcindo Guanabara
25/10th floor
20031 Rio de Janeiro, RJ
Phone: (021) 240-8225
Telex: 11-32017 (WORD BR)

MEXICO
Kevin Kelleghan
COMPUTERWORLD de MEXICO
Oaxaca 21-2
Colonia Roma
Mexico City 7 D.F.
Phone: (905) 514-4218
(905) 514-6309

TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, NOVEMBER 25, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	34 3/8	- 1/4	-0.7
N	BURROUGHS CORP	47- 88	52 3/8	+5 1/8	+10.8
O	COMPUTER AUTOMATION	9- 27	24 1/4	+ 1/4	+1.0
N	CONTROL DATA CORP	35- 77	73 1/2	+1	+1.3
O	CRAY RESEARCH INC	30-101	99 1/4	+1 1/4	+1.2
N	DATA GENERAL CORP	46- 87	76 5/8	+1	+1.3
N	DATAPOINT CORP	44-115	115	+4	+3.6
N	DIGITAL EQUIPMENT	52- 98	91 1/4	-4	-4.1
A	EECO INC	9- 24	24	- 1/8	-0.5
N	ELECTRONIC ASSOC.	6- 12	8 1/2	+ 1/4	+3.0
N	FOUR-PHASE SYSTEMS	20- 49	25 3/4	-2 1/8	-7.6
N	FOXBORO	31- 59	58 3/4	+2 1/2	+4.4
O	GENERAL AUTOMATION	7- 19	9 7/8	+ 3/4	+8.2
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	46- 95	92	-2 3/4	-2.9
N	HONEYWELL INC	65-104	103 3/4	+4 1/8	+4.1
N	IBM	50- 79	69 1/2	-1 7/8	-2.6
O	MAGNUSON COMP SYSTS	20- 45	43 1/2	-1 1/2	-3.3
N	MANAGEMENT ASSIST	9- 25	18 1/4	-2 1/2	-12.0
O	MANUFACTURING DATA S	22- 80	79 1/2	+4 1/4	+5.6
O	MINI-COMPUTER SYST	2- 6	2 7/8	- 1/4	-8.0
O	MODULAR COMPUTER SYS	9- 31	27 1/4	- 1/2	-1.8
N	NCR	52- 82	72 1/4	- 3/4	-1.0
N	PRIME COMPUTER INC	15- 56	55 7/8	+ 1/4	+0.4
N	PERKIN-ELMER	26- 69	68	+1 3/8	+2.0
N	SPERRY RAND	42- 60	59 7/8	+ 7/8	+1.4
A	SYSTEMS ENG. LABS	11- 47	46 1/2	+ 1/4	+0.5
O	TANDEM COMPUTERS INC	13- 68	67 1/4	+2 3/4	+4.2
N	TEXAS INSTRUMENTS	79-146	146 1/8	+4 1/8	+2.9
A	WANG LABS.	17- 60	41 1/2	-2	-4.5

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 27	22 1/4	+ 1/4	+1.1
N	COMDISCO INC	6- 23	22 5/8	- 1/4	-1.0
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	1 3/4	+ 1/8	+7.6
O	CONTINENTAL INFO SYS	2- 15	4 7/8	- 1/8	-2.5
M	DATRONIC RENTAL	2- 5	4 1/2	+ 1/4	+5.8
A	DCL INC	3- 6	2 5/8	- 1/4	-8.6
N	DPF INC	5- 12	6 5/8	- 1/8	-1.8
N	ITEL	1- 15	1 1/8	- 1/8	-10.0
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 5/8	0	0.0
N	RELIANCE GROUP INC	24- 79	73 1/4	+3 3/4	+5.3
N	U.S. LEASING	12- 24	23 3/8	+ 3/8	+1.6

* CULLINANE CORP PRICE DECLINE IN NOV 12 REPORT RESULT OF STOCK SPLIT. CORRECT PRICE OF 29 1/8 WAS +2 1/8 AND +7.3% FOR THE WEEK.

SOFTWARE & EDP SERVICES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	4 7/8	- 1/2	-9.3
O	ANACOMP INC	7- 24	21 1/2	-1 3/8	-6.0
O	ANALYSTS INTL CORP	3- 12	12	+ 1/2	+4.3
A	APPLIED DATA RES.	6- 24	20 5/8	- 1/8	-0.6
N	AUTOMATIC DATA PROC	31- 52	48 1/4	-2 3/4	-5.3
O	CGA COMPUTER ASSOC	9- 17	16 1/2	+1 3/4	+11.8
O	COMPUTER HORIZONS	1- 5	2 5/8	- 1/8	-4.5
O	COMPUTER NETWORK	4- 9	7 1/2	0	0.0
N	COMPUTER SCIENCES	11- 30	16 3/4	-2 1/8	-11.2
O	COMPUTER TASK GROUP	1- 23	22	-1 1/4	-5.3
O	COMPUTER USAGE	2- 10	7 1/4	-1	-12.1
O	COMPUT AUTO REP SVC	4- 11	11 1/8	+ 1/8	+1.1
O	COMSHARE	11- 21	16 1/4	- 1/2	-2.9
O	CULLINANE CORP *	18- 65	38	- 1/2	-1.2
O	DATA DIMENSIONS INC	1- 6	1 1/4	- 1/8	-9.0
O	DATATAB	1- 4	1 1/8	0	0.0
O	DSI CORP	4- 9	8 5/8	+ 1/8	+1.4
N	ELECTRONIC DATA SYST	19- 37	32	-1 5/8	-4.8
O	INFORMATICS INC	9- 25	24 1/4	+1	+4.3
O	INSYTE CORP	1- 3	2 1/8	+ 3/8	+21.4
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5 3/4	+ 1/4	+4.5
O	KEYDATA CORP	1- 5	3/4	+	+8.3
A	LOGICON	12- 30	29 7/8	+1 1/4	+4.3
O	MATHEMATICA INC	5- 18	13 1/4	+ 3/4	+6.0
O	MATHEMATICAL APP GRP	7- 33	19 1/2	-1	-4.8
O	NATIONAL DATA CORP	10- 31	29 1/2	- 1/4	-0.8
N	PLANNING RESEARCH	5- 13	11 1/2	- 1/8	-1.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 10	9 3/4	+1 1/4	+14.7
O	REYNOLDS & REYNOLD	21- 34	24	+ 1/2	+2.1
O	STSC INC	6- 24	23 3/4	+4 1/4	+21.7
O	SCIENTIFIC COMPUTERS	6- 29	27 1/4	- 3/4	-2.6
N	TYMSHARE INC	34- 87	86	+1 3/8	+1.6
A	URS SYSTEMS	5- 17	16 7/8	+ 1/2	+3.0
N	WYLY CORP	4- 20	16 5/8	0	0.0

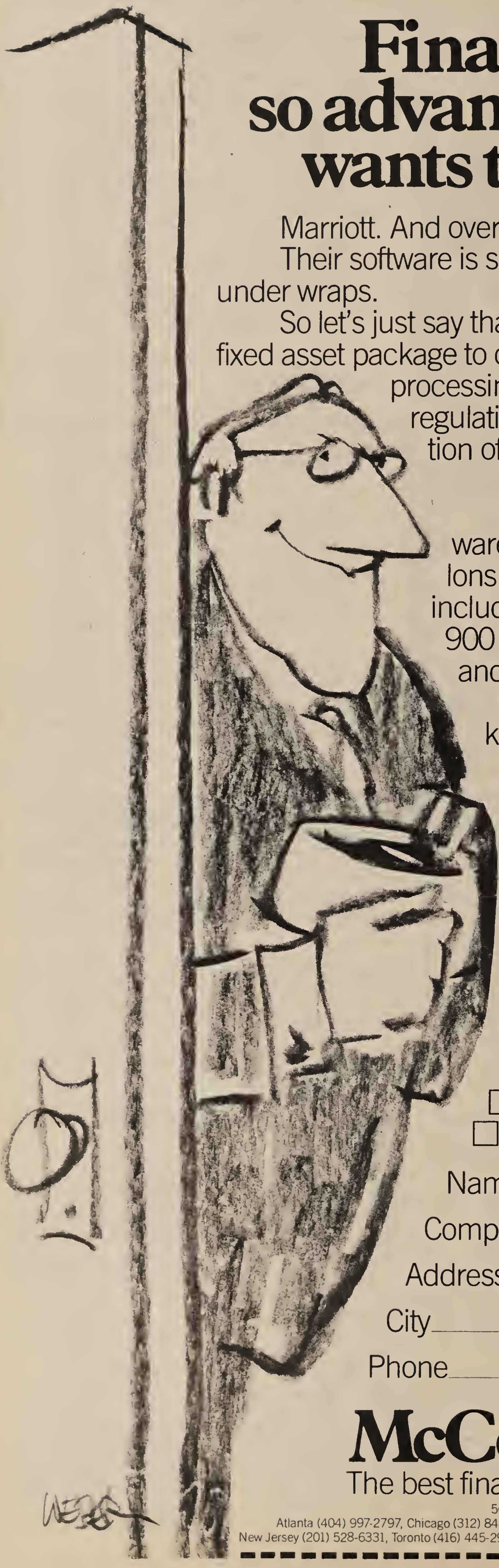
PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	16 5/8	+1 3/4	+11.7
N	AMPEX CORP	14- 35	34 1/2	+2 1/2	+7.8
A	ANDERSON JACOBSON	9- 25	22 5/8	0	0.0
N	APPLIED DIG DATA SYS	5- 12	11 7/8	0	0.0
O	AUTO-TROL TECHNOLOGY	18- 62	49	+ 1/2	+1.0
O	BEEHIVE INT'L	3- 24	24	+2 3/8	+10.9
A	BOLT,BERANEK & NEW	12- 36	35 3/4	+2 1/4	+6.7
N	BUNKER-RAMO	17- 41	39 5/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 9	2 7/8	- 1/4	-8.0
N	CENTRONICS DATA COMP	20- 55	27 5/8	-2 3/4	-9.0
A	CETEC CORP	3- 7	6	- 1/4	-4.0
O	COMPUTER DEVICES INC	5- 10	7	+ 1/4	+3.7
O	COGNITRONICS	1- 10	10	+ 3/8	+3.8
O	COMPUTER COMMUN.	4- 10	3 3/8	+ 1/4	+8.0
O	COMPUTER CONSOLES	4- 29	23 3/4	0	0.0
O	COMPUTER TRANSCEIVER	1- 5	4 7/8	- 1/4	-4.8
N	COMPUTERVISION CORP	24- 92	80 3/4	+ 3/4	+0.9
N	CONRAC CORP	13- 25	19 5/8	+1	+5.3
A	DATA ACCESS SYSTEMS	6- 20	19 1/8	+ 7/8	+4.7
A	DATA PRODUCTS CORP	11- 36	35 3/4	+2 1/8	+6.3
O	DATUM INC	2- 5	4 1/4	- 1/8	-2.8
O	DECISION DATA COMPUT	2- 6	4 5/8	+ 1/2	+12.1
O	DELTA DATA SYSTEMS	1- 3	1 3/4	- 1/8	-6.6
N	DOCUMATION INC	7- 27	18 3/4	+ 3/4	+4.1
O	DATARAM CORP	6- 37	12	+ 1/8	+1.0
N	ELECTRONIC M & M	3- 9	8 3/4	+ 1/8	+1.4
O	EVANS & SUTHERLAND	21- 83	76 1/2	-6	-7.2
O	FABRI-TEK	1- 4	2 1/4	- 3/8	-14.2
O	GENERAL COMPUTER SYS	1- 7	6	0	0.0
O	GENERAL DATACOMM IND	8- 20	21	+1 7/8	+9.8
O	GENERAL TERMINAL CP	1- 4	2 1/8	- 1/4	-12.4
N	HAZELTINE CORP	12- 33	27 3/4	- 5/8	-2.2
N	HARRIS CORP	25- 55	52 1/4	-3 1/8	-5.6
O	INFORMATION INTL INC	8- 15	12	- 1/4	-2.0
O	INTEL CORP	23- 50	46 3/4	-2	-4.1
O	INTERSIL	13- 34	33 3/4	+ 1/4	+0.7
A	LUNDY ELECTRONICS	4- 17	10 1/2	- 3/4	-6.6
O	MSI DATA CORP	5- 16	14 7/8	+ 3/4	+5.3
N	MEMOREX	10- 34	14 1/8	0	0.0
N	MOHAWK DATA SCI	10- 31	27	- 1/8	-0.4
O	OMEX	2- 12	12	0	0.0
A	PARADYNE CORP	18- 65	63 1/4	-1 3/4	-2.6
A	PENRIL CORP	9- 15	14 3/8	+ 3/4	+5.5
O	RAMTEK CORP	10- 21	20	+1 3/4	+9.5
O	RECOGNITION EQUIP	5- 21	20 1/2	+ 5/8	+3.1
O	SCAN DATA	1- 5	1 3/4	- 1/8	-9.7
N	STORAGE TECHNOLOGY	12- 25	25 1/4	+ 5/8	+2.5
O	SYKES DATATRONICS	14- 50	32 1/4	-3	-8.5
O	T BAR INC	14- 24	22 3/4	0	0.0
A	TEC INC	3- 9	4 3/4	- 1/2	-9.5
N	TEKTRONIX INC	42- 70	64 3/4	-3	-4.4
N	TELEX	3- 6	6	+ 1/4	+4.3
O	TESDATA SYSTEMS CP	8- 26	14 5/8	- 1/8	-0.8
A	TIMEPLEX INC	7- 32	31 1/2	+1 1/2	+5.0
O	WILTEK INC	1- 3	2 1/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	0- 15	14 3/8	0	0.0
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	8- 22	20 5/8	- 1/8	-0.6
O	CYBERMATICS INC	1- 2	1 1/8	- 1/8	-10.0
A	DUPLEX PRODUCTS INC	11- 16	13 5/8	- 1/4	-1.8
N	ENNIS BUS. FORMS	13- 21	16 3/8	+ 1/8	+0.7
N	3M COMPANY	46- 63	59 3/8	- 5/8	-1.0
O	MOORE CORP LTD	27- 37	33 1/4	+ 3/8	+1.1
N	NASHUA CORP	20- 35	27 1/8	-1 1/4	-4.4
O	STANDARD REGISTER	22- 35	30 3/4	- 1/4	-0.8
A	TAB PRODUCTS CO	9- 27	26 3/8	+1	+3.9
N	WABASH MAGNETICS	11- 27	26 1/2	+2	+8.1
N	WALLACE BUS FORMS	23- 52	45 5/8	-3	-6.1

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR



Financial software so advanced that Marriott wants to keep it a secret.

Marriott. And over 1,000 McCormack & Dodge users.

Their software is so far ahead they'd prefer we kept the subject under wraps.

So let's just say that Marriott uses their McCormack & Dodge fixed asset package to control a worldwide asset base, to simplify tax processing under the complex Asset Depreciation Range regulation, and to pinpoint the most profitable combination of depreciation method and IRS regulation.

The rest of the story is public record.

In McCormack & Dodge, Marriott found a software vendor with proven success in the highest echelons of the hotel and resort industry. Whose client list includes no less than 100 of the *Fortune* 500. Plus over 900 other leading companies, ranging from the oldest and biggest to the youngest and fastest growing.

McCormack & Dodge. Where we've never known second place in the Datapro ratings. Where F/A Plus has won world acclaim as the ultimate fixed asset system. Where only specialists in fixed asset accounting are authorized to present and sell the F/A Plus package.

And where, in seven out of ten cases, prospects who sit down and talk do more than just talk. They become customers.

We'd like to show you why.

Please send schedule of free seminars, plus information on: ☐ General Ledger, ☐ Purchase Order, ☐ Accounts Payable, ☐ Fixed Assets, ☐ Capital Project Analysis

Name______________________________

Company__________________Title____________

Address______________________________

City__________________State________Zip________

Phone______________Computer Model____________

CW12/1

McCormack & Dodge

The best financial software. The best financial people.

560 Hillside Avenue, Needham Heights, MA 02194, (617) 449-4012
Atlanta (404) 997-2797, Chicago (312) 843-3400, Dallas (214) 369-7014, Los Angeles (213) 645-6382, Washington, D.C. (703) 734-0710, New York/New Jersey (201) 528-6331, Toronto (416) 445-2971 • United Kingdom/Netherlands • Italy • Australia/New Zealand • Mexico • South Africa • Sweden • Hong Kong